



Staff Report of the
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

**AGRICULTURAL DRAINAGE CONTRIBUTION
TO WATER QUALITY IN THE
GRASSLAND WATERSHED OF
WESTERN MERCED COUNTY, CALIFORNIA:
OCTOBER 1998 - SEPTEMBER 2000
(WATER YEARS 1999 AND 2000)**



APRIL 2002

State of California
California Environmental Protection Agency
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

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EXECUTIVE SUMMARY

Since May 1985, the Central Valley Regional Water Quality Control Board (Regional Board) has conducted a water quality monitoring program in the San Joaquin Valley of California to assess the impacts of agricultural subsurface drainage on wetland water supply channels in the Grassland Watershed as well as on the lower San Joaquin River. The Grassland Watershed is a 370,000-acre area, west of the San Joaquin River, covering portions of Merced and Fresno counties between the Tulare Lake Basin and the Orestimba Creek alluvial fan. The watershed contains both farmed land, including a 97,000-acre area known as the Drainage Project Area (DPA), and approximately 100,000 acres of wetland habitat, including State and Federal wildlife refuges and private gun clubs. The watershed is tributary to the San Joaquin River, with Mud Slough (north) and Salt Slough serving as the main drainage arteries.

The time period covered by this report, 1 October 1998 through 30 September 2000 (Water Years 1999 and 2000¹), represents the third and fourth years of operation of the Grassland Bypass Project (GBP). The project began operation on 23 September 1996 and consolidated subsurface agricultural drainage, which historically flowed through wetland water supply channels, into a single channel, allowing the drainage to bypass approximately 90 miles of wetland water supply channels and Salt Slough. The drainage was redirected into the final 28 miles of the San Luis Drain for discharge into the lower nine miles of Mud Slough (north) and eventually into the San Joaquin River.

During Water Years 1999 and 2000, water quality sampling was conducted at 12 sites within the Grassland Watershed and represented drainage from the DPA, internal wetland supply canals and overall discharge from the watershed. The primary constituents evaluated included electrical conductivity, boron and selenium, with more limited analyses of molybdenum, copper, chromium, lead, nickel, zinc, chloride and sulfate. Grab samples were collected on a weekly, monthly or quarterly schedule depending on the location. Automated, composite samples were collected at selected sites to provide information on fluctuating concentrations and to provide a more complete data set for salt, boron, and selenium load calculations.

The San Joaquin River Index is used to classify water year type in the river basin based on total runoff (SWRCB, 1995). Water Years 1999 and 2000 were both classified as an above normal water years as opposed to wet Water Years 1997 and 1998. Water Year 1999 was the first water year since the GBP began operation that localized flooding did not occur within the Grassland Watershed.

As noted in previous reports (Chilcott, et al., 1998, Chilcott, *et al.*, 2000a), consolidating all subsurface agricultural drainage into the San Luis Drain for discharge into Mud Slough (north) markedly improved the water quality of internal channels and Salt Slough. During Water Years 1999 and 2000, the improvements continued with electrical conductivity, boron and selenium concentrations in the internal canals and Salt Slough significantly lower than pre-project conditions. A corresponding increase in constituent concentrations was noted in Mud Slough (north) downstream of the San Luis Drain, reflecting discharge from the San Luis Drain.

¹ A Water Year covers the time period from 1 October through 30 September of the following year.

In October 1988, the Regional Board adopted water quality objectives for boron, molybdenum and selenium for Mud Slough (north) and Salt Slough and a selenium objective for water used to maintain wetland habitat (Resolution #88-195). The mean monthly boron objective (2.0 mg/L) depends on season and only applies from 15 March through 15 September, while the maximum objective of 5.8 mg/L applies year round. In May 1996, the Regional Board adopted revised selenium water quality objectives for the two sloughs and for wetland water supply channels. Selenium water quality objectives are 2 ug/L (monthly mean) for Salt Slough and wetland water supply channels and 5 ug/L (4-day average) for Mud Slough (north). The Mud Slough objective is subject to a compliance time schedule. The compliance time schedule does not require compliance with the selenium objective until 1 October 2010. No water quality objectives have been adopted for the San Luis Drain.

During Water Years 1999 and 2000, the 2.0 mg/L monthly mean boron objective was only exceeded in Mud Slough (north) downstream of the San Luis Drain discharge. Upstream of the discharge, the concentrations approached 2.0 mg/L during March, April, July and August, but did not exceed the objective. The elevated concentrations may be due to a number of factors including localized groundwater seepage, releases from wetlands, and other surface drainage. Downstream of the discharge, boron concentrations were above 2 mg/L continuously from March through September. Mean monthly boron concentrations in Salt Slough remained below 1.5 mg/L from 15 March through 15 September during both Water Years 1999 and 2000.

Selenium concentrations remained below the 2 ug/L water quality objective in Salt Slough during Water Year 1999 and Water Year 2000. Selenium concentrations greater than 2 ug/L occurred sporadically in the wetland water supply channels, with the majority of elevated concentrations during February, March, and April. Elevated concentrations in the supply channels may be due to a number of factors including elevated selenium levels in supply water, inflows from agricultural subsurface drainage sources outside of the DPA, and local sources such as groundwater seepage and surface return flows. The cause of the elevated concentrations in the wetland supply channels are being investigated by Regional Board staff and local water agencies. Results of early investigations have been published separately (Chilcott, 2000b and Eppinger, *et al.*, 2002).

Selenium concentrations in Mud Slough (north) above the drainage discharge remained below 2 ug/L, while monthly mean concentrations in the slough downstream of the drainage discharge remained above 5 ug/L, ranging from 5.2 ug/L in October 1999 to 39.4 ug/L in July 2000. Daily selenium concentrations in discharge from the San Luis Drain ranged from 21.6 ug/L to 122 ug/L during the two water years.

Molybdenum concentrations were measured monthly at four sites during Water Years 1999 and 2000: Mud Slough (north) both upstream and downstream of the San Luis Drain discharge, the San Luis Drain discharge itself, and Salt Slough. The molybdenum objective (19 ug/L) was only exceeded downstream of the drainage discharge, peaking at 24 ug/L in April of Water Year 2000. Monthly grab sample molybdenum concentrations in the drainage discharge ranged from 19 ug/L to 36 ug/L. No molybdenum objectives apply to the San Luis Drain.

On 24 July, 1998 the Central Valley Regional Water Quality Control Board adopted Waste Discharge Requirements (Order No. 98-171) to regulate the discharge of subsurface agricultural drainage through a portion of the San Luis Drain to Mud Slough (north) and ultimately the San Joaquin River. Compliance with the Waste Discharge Requirements is based in part on monthly and annual selenium load allocations. Salt, boron, and selenium loads for the DPA, and the Grassland Watershed were estimated based upon the flow weighted monthly average of available water quality data for Water Years 1999 and 2000. Discharge for these sites was based upon United States Geological Survey (USGS) reported daily discharges.

Since Water Year 1997 (beginning of GBP), monitoring has shown continued salt, boron, and selenium load reductions from the DPA and Grassland Watershed, with the exception of Water Year 1998 (a wet year). During Water Years 1999 and 2000, discharge from the Drainage Project Area was comparable, at 32 thousand acre-feet (taf) in Water Year 1999 and 31 taf in Water Year 2000. Salt load from the Drainage Project Area decreased from 147,000 tons in Water Year 1999 to 136,000 tons in Water Year 2000, a decrease of 8%. Boron load decreased from 643,000 lbs in Water Year 1999 to 605,000 lbs in Water Year 2000, a decrease of 6%. Selenium load from the Drainage Project Area decreased from 5,120 lbs in Water Year 1999 to 4,590 lbs in Water Year 2000, a decrease of 10%. Monthly selenium loads for the DPA remained below the monthly selenium load allocations specified in the Waste Discharge Requirements during all months of Water Years 1999 and 2000.

Discharge from the Grassland Watershed decreased from 253 taf in Water Year 1999 to 235 taf in Water Year 2000, a decrease of 7%. Salt load from the Grassland Watershed decreased from 402,000 tons in Water Year 1999 to 374,000 tons in Water Year 2000, a decrease of 7%. Boron load from the Grassland Watershed decreased from 1.2 million lbs in Water Year 1999 to 1.1 million lbs in Water Year 2000, a decrease of 8%. Selenium load from the Grassland Watershed decreased from 5,910 lbs in Water Year 1999 to 4,700 lbs in Water Year 2000, a decrease of 20%.

Water quality monitoring is continuing in the Grassland Watershed to meet the requirements both of the WDRs and the Agreement for Use of the San Luis Drain. Draft water quality information from the continuing studies is available on the following Central Valley Regional Water Quality Control Board website:

<http://www.swrcb.ca.gov/rwqcb5/programs/index.html>

A full review of the information required by the WDRs and additional information related to the GBP is found in the Grassland Bypass Project Annual Report (SFEI, 1999 and 2000).

INTRODUCTION

The Agricultural Unit of the Central Valley Regional Water Quality Control Board (Regional Board) initiated a water quality monitoring program in May 1985 to evaluate the effects of subsurface agricultural drainage on the water quality of canals, drains, and sloughs in the Grassland Watershed in western Merced County as well as in the lower San Joaquin River. The purpose of this monitoring program was to compile an on-going database of selected inorganic constituents found in agricultural drains that discharge to and flow through wildlife areas before entering the San Joaquin River. This database has been and continues to be used to develop and evaluate water quality programs addressing agricultural drainage in the San Joaquin River Basin.

This report contains laboratory results and a summary of water quality analyses for all constituents measured within the Grassland Watershed as part of the program during Water Years 1999 and 2000 (October 1998 through September 2000).² Water Year 1999 (WY 99) represents conditions during the third year of operation of the Grassland Bypass Channel Project and Water Year 2000 (WY 00), the fourth year. The Grassland Bypass Project (GBP) consolidated subsurface agricultural drainage, which historically flowed through wetland water supply channels, into a single channel, allowing the drainage to bypass approximately 90 miles of wetland water supply channels. Water quality information collected as part of this multi-agency project is available on the Internet on the Regional Board website at:

www.swrcb.ca.gov/rwqcb5/agunit/bypass/disclaim.htm

This report presents the water quality data collected by the Regional Board and compares salinity (measured as electrical conductivity), boron and selenium water quality at selected sites with respect to hydrology, change in water management, and applicable water quality objectives.

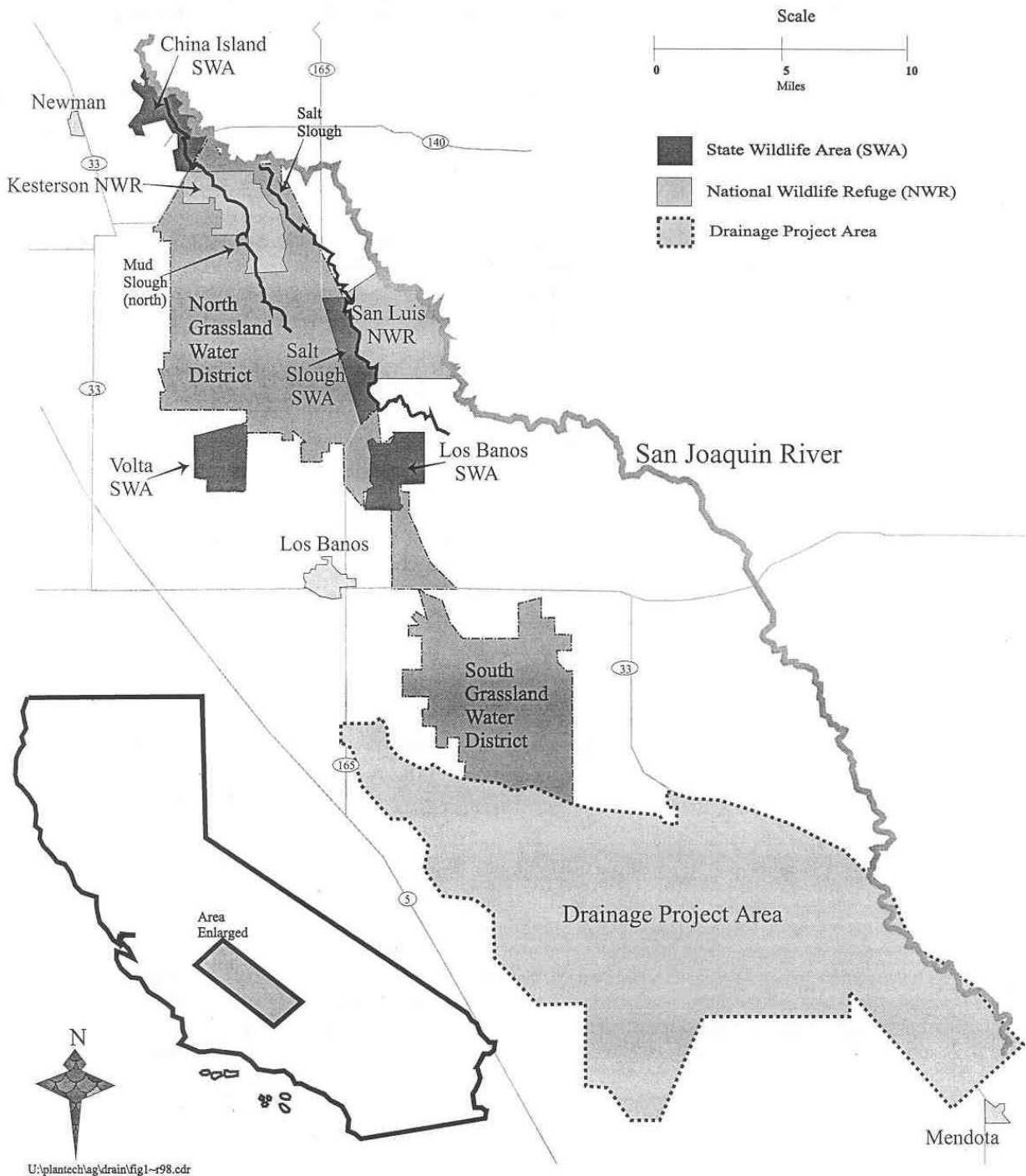
Water quality data collected during the previous years of study can be found in both a summary report presenting salinity, boron, and selenium information from May 1985 through September 1996 (Steensen et al., 1998) and in a series of annual reports presenting all water quality information collected through September 1998 (James et al., 1988; Chilcott et al., 1989; Westcott et al., 1990, 1991, and 1992; Karkoski and Tucker, 1993; Vargas et al., 1995; Chilcott et al., 1995; Steensen et al., 1996; Chilcott et al., 1998 and Chilcott et al., 2000a). This monitoring program was designed to complement monitoring programs conducted by other State, federal, and local agencies.

STUDY AREA

The study area consists of the Grassland Watershed located west of the San Joaquin River between the towns of Newman and Mendota, in the San Joaquin River Basin in California. The watershed encompasses approximately 370,000 acres and includes the northern and southern divisions of

² A water year lasts from October 1st of one year through September 30th of the following year.

Figure 1. Grassland Watershed, State and Federal Wildlife Refuges, and Drainage Project Area



Grassland Water District (GWD), and farmlands adjacent to the district. The watershed contains a 97,000-acre area known as the Drainage Project Area (DPA), and approximately 100,000 acres of wetland habitat, including State and Federal wildlife refuges and private duck ponds flooded for waterfowl habitat (**Figure 1**).

Prior to October 1996, agricultural lands east, west, and south of the GWD discharged subsurface agricultural drainage water (tile drainage) and surface runoff (irrigation tailwater) through GWD. Subsurface drainage from this area often contains high concentrations of salt, selenium and other trace elements. This regional drainage flowed north through the GWD, carried by a network of canals that could divert water in several possible ways before discharging into Mud Slough (north) or Salt Slough. These two sloughs are tributary to the San Joaquin River and serve as the primary drainage outlets for the Grassland Watershed.

After October 1996, all subsurface agricultural drainage from the DPA was rerouted into the Grassland Bypass which discharges into the final 28 miles of the San Luis Drain. The consolidated subsurface drainage is then released into Mud Slough (north), nine miles upstream of its confluence with the San Joaquin River. Consolidating the subsurface drainage removed the primary source of selenium from approximately 90 miles of canals which can supply water to wetland habitat. Reducing selenium in these water bodies was a primary goal of the project, since elevated concentrations of selenium have been documented to impact waterfowl (Skorupa, 1998).

A small number of subsurface agricultural drainage systems to the east and west of the Grassland Water District continue to discharge into local drainage courses that enter the wetland area. Evaluation of these discharges as well as potential selenium sources from supply water is being conducted by local water agencies and Regional Board staff.

SAMPLING PROGRAM

Prior to October 1996, water quality sampling was conducted at inflow sites to, internal flow sites within the GWD, and four outflow sites from the Grassland Watershed. Inflow monitoring stations were located on drains that discharge into the GWD, mainly situated at the southern end of the study area. Internal sites were located on canals that carried or could carry subsurface drainage as it passed through the GWD, before discharging to the San Joaquin River. Outflow monitoring stations were located on water bodies which flow out of the Grassland Watershed.

Mud Slough (north) and Salt Slough are the primary tributaries to the San Joaquin River that drain the Grassland Watershed and are described in detail in previous reports (Pierson, *et al.*, 1989a and 1989b). Mud Slough (north) downstream of the San Luis Drain (MER542) and Salt Slough at Lander Avenue (MER531) are located near flow monitoring stations operated by the U.S. Geological Survey and are two principal stations in this monitoring program.

During Water Year 1997, the water quality monitoring program was altered to reflect the changes in drainage water management resulting from the use of the Grassland Bypass. With the consolidation of agricultural subsurface drainage, a majority of the inflow sites which historically contained the drainage, were eliminated from the sampling program. The remaining sites focus on providing data which can be used to evaluate the impact of the bypass. Key sites which were

maintained and provide comparison to pre-bypass conditions include: Camp 13 Slough and Agatha Canal (inflow); Santa Fe and San Luis Canals at Henry Miller Road (internal); and Mud Slough (north) downstream of the San Luis Drain terminus and Salt Slough (outflow). In addition, three new sites were added to evaluate the discharge from the bypass itself: Mud Slough (north) upstream of the bypass discharge (MER536), discharge from the San Luis Drain (MER535), and inflow from the Grassland Bypass to the San Luis Drain at Check 17 (MER562).

Table 1. Water Quality Monitoring Sites in the Grassland Area for Water Years 1999 and 2000

Map Index*	RWQCB Site I.D.	Site Name	Site Type
I-4	MER506	Agatha Canal @ Mallard Road	Inflow
I-7	MER505	Camp 13 Slough	Inflow
T-1	MER510	CCID Main @ Russell Avenue	Inflow
A	MER545	Santa Fe Canal @ weir	Internal Flow
B	MER563	San Luis Canal @ splits	Internal Flow
O-2	MER542	Mud Slough (N) @ San Luis Drain	Outflow
O-4	MER531	Salt Slough @ Lander Avenue	Outflow
SLD-1	MER562	Inflow to San Luis Drain @ Check 17	Internal Flow
SLD-2	MER535	San Luis Drain @ Terminus	Outflow
O-8	MER536	Mud Slough (N) Upstream of SLD	Internal Flow

* Location map in Appendix A

Water Year 1999 continued the monitoring program begun during Water Year 1997 with one addition: the Central California Irrigation District (CCID) Main Canal at Russell Blvd. The addition was instigated in order to identify selenium concentrations in one of the major supply water sources. Two sites were also relocated during Water Year 1999. Both the San Luis Canal and Santa Fe Canal at Henry Miller Road sites were moved approximately one quarter mile upstream to avoid a potential area of commingling. In total, water samples were collected at ten sites during Water Years 1999 and 2000 (**Table 1**).

SAMPLE COLLECTION METHODS

Two distinct types of water samples were collected for this program: grab samples and automated composite samples. Staff from the Panoche Water District collected grab samples from six of the sites during Water Years 1999 and 2000: the CCID Main Canal, Camp 13, Agatha Canal, Santa Fe Canal @ weir, San Luis Canal @ splits, and the Grassland Bypass inflow to the San Luis Drain. Staff from the Regional Board collected samples from the remaining sites. Field measurements for water temperature, electrical conductivity (EC), and pH were conducted at all sites monitored by Regional Board staff. Follow up EC measurements were made on all samples at the Regional Board office laboratory within 24 hours for samples collected by Regional Board staff and within 24 hours of receipt of samples from Panoche Water District staff. The types of samples, methods for collection and quality control and assurance are discussed below.

Grab Samples

During Water Years 1999 and 2000, grab samples were collected on either a weekly, monthly or quarterly basis depending on the site and the constituent to be analyzed (**Table 2**). Analyses for EC, total boron, and total selenium were conducted on all samples. Samples were analyzed for

dissolved selenium (WY 99) and total suspended solids (WYs 99 and 00) at both the inflow to and outflow from the San Luis Drain. Selected sites were also monitored for molybdenum, copper, chromium, nickel, lead, and zinc on a monthly or quarterly basis.

Table 2. Monitoring Sites, Sampling Frequencies, and Parameters Measured: WYs 99 & 00

Site ID	Site Description	Constituents										Dissolved Se	Auto-Samplers
		Temp	pH	EC	Se	Mo	TE's	B	PM	TDS	TSS		
MER510	CCID Main @ Russell Ave.			W	W			W					
MER505	Camp 13 Slough @ Gauge Station			W	W			W					
MER506	Agatha Canal @ Mallard Rd.			W	W			W					
MER545	Santa Fe Canal @ weir			W	W			W					
MER563	San Luis Canal @ splits			W	W			W					
MER536	Mud Slough (n) Upstream of San Luis Drain	W	W	W	W	M	Q	W	Q				
MER562	Inflow at San Luis Drain: Check 17			W	W			W		W		W*	b
MER535	San Luis Drain @ Terminus	W	W	W	W	M	Q	W	Q	W**	W	W*	a
MER542	Mud Slough (n) Downstream of San Luis Drain	W	W	W	W	M	Q	W	Q		W*		
MER531	Salt Slough @ Lander Ave.	W	W	W	W	Q	Q	W	Q		W*		

* Water Year 1999 only

** February through September, 2000

W = weekly

M = monthly

Q = quarterly

a = daily composite sample for Se and B

b = daily EC, weekly composite sample for Se and B

B = Boron

EC = Electrical conductivity

Mo = Molybdenum

Se = Selenium

PM = Partial Mineral Series (B, Cl, SO₄, Hardness)

TE's = Trace Elements (Chromium, copper, lead, nickel, zinc)

TDS = total dissolved solids

TSS = total suspended solids

Grab samples were collected in polyethylene bottles, usually within six feet of the bank. Depth integrated samples were collected mid-channel at the inflow to the San Luis Drain, outflow from the San Luis Drain, and at Mud Slough (north) downstream of the San Luis Drain discharge. All sample bottles were rinsed with deionized water before use. All bottles were also rinsed three times with the water to be sampled prior to sample collection. All samples were kept cool (less than 4 degrees Centigrade) or refrigerated after collection and until processing. Total selenium, boron, and trace element samples were preserved by lowering the pH to less than 2 within 24 hours of collection, using reagent grade nitric acid. Mineral and total suspended solids samples were kept on ice or refrigerated until submittal to the laboratory for analysis. During WY 99, samples collected for dissolved selenium analyses were filtered in the field using an acid washed and DI rinsed cartridge system with a 0.45 um filter. The filtrate was then placed on ice until acidification to a pH<2 (within 24 hours) using reagent grade nitric acid.

Composite Automated Samples

In addition to grab samples, daily composite sampling was conducted at the inflow to and discharge from the San Luis Drain using automated Sigma sampling devices. The sampler at the inflow to the drain is operated by the Grassland Area Farmers (GAF) and was programmed to collect approximately 500 ml of sample daily. Once a week, the previous week's samples were transferred to the Regional Board for processing. Electrical conductivities were determined for each of the daily samples and then the individual samples were combined, using equal volumes, to create a weekly composite. The composite sample was then preserved to pH<2 using reagent grade nitric acid and sent to contract laboratories for total boron and total selenium analyses.

Two autosamplers (one strictly backup) were operated at the terminus of the San Luis Drain site. Each daily composite was made up of six 85-ml collections pulled at four hour intervals for a total sample volume of 510 ml. During the year, the autosamplers were serviced every two weeks. The daily samples were analyzed for EC, boron and selenium. Quality control and assurance methods for the autosamplers are discussed in the following section.

QUALITY CONTROL AND QUALITY ASSURANCE

Potential contamination from the reagent grade nitric acid used to control pH was evaluated by submitting a deionized water matrix preserved with the normal amount of acid used (1 ml nitric acid per 500 ml of sample), to the contract laboratories at monthly intervals to be analyzed for the trace elements of concern. All reported recoveries for these acid check samples were below the analytical detection limit.

Field and handling contamination was evaluated by submitting a travel blank on a monthly basis. The travel blank consisted of a sample of deionized (DI) water which was collected at the Regional Board laboratory, traveled through the sampling run, and was then processed with the sample set. All results for travel blanks fell below the analytical detection limits for the elements of concern.

Table 3. Quality Assurance Tolerance Guidelines Used in the Regional Water Quality Control Board Agricultural Drainage Monitoring Program .

Constituent	Recovery Range at Low Levels ($\mu\text{g/L}$)*	Acceptable Split/Spike Recovery Range
Copper	1-20 \pm 5	>20 70-130%
Chromium	1-20 \pm 5	>20 70-130%
Lead	5-25 \pm 8	>25 60-140%
Molybdenum	1-10 \pm 2	>10 85-115%
Nickel	5-25 \pm 6	>25 65-135%
Selenium	0.4-10 \pm 1.0	>10 90-110%
Zinc	1-20 \pm 6	>20 70-130%
Boron	50	85-115%
Chloride	5000	85-115%

* For certain constituents, recovery is expressed as an absolute value rather than a percentage at low levels. For example, if the result of copper analysis for a particular sample is 10 $\mu\text{g/L}$, a split analysis must fall between 5 $\mu\text{g/L}$ and 15 $\mu\text{g/L}$. If the sample is greater than 20 $\mu\text{g/L}$, recovery is expressed as a percent and must be between 70 and 130%. If a recovery range is not shown at low levels, the detection limit is given.

Additional quality control and quality assurance was conducted using blind split and spiked samples. Blind split samples were collected at a minimum ten percent frequency for each sampling event by collecting the sample in a container double the normal sample volume and splitting that sample into two equal amounts for submittal to the analyzing laboratory. On a

monthly basis, half of the blind split samples were spiked with known concentrations of constituents to be analyzed. Comparing the spiked splits to the background splits provided information on analytical accuracy. Comparing data from nonspiked splits provided information on analytical precision.

To evaluate the potential for contamination and evapo-concentration in samples collected using the Sigma autosampler operated by the Regional Board at the discharge from the San Luis Drain, a series of special checks were developed. First, each time the sampler was serviced, a deionized water sample, without a cap, was left in the collection base to be collected on the next servicing and analyzed for potential contamination. Second, during each servicing, replicate “grab” samples were collected through the autosampler mechanism, one grab sample was left in the sampler to be collected at the next servicing and the other grab sample was processed for immediate analyses. Final results of the two grabs were evaluated to determine concentration or dilution potentials.

Approximately every six weeks, both Sigma units operated by the Regional Board at the discharge from the San Luis Drain were rotated out of the field for full servicing and tubing replacement. Prior to the rotation, a sample of deionized water was passed through the used tubing and pump unit and analyzed for EC, boron and selenium. The automated sampler at the Inflow site was maintained by the Grassland Area Farmers.

During Water Year 1999, samples for dissolved selenium were collected at two locations: inflow to and discharge from the San Luis Drain (MER535 and MER562). These samples required field filtration through an 0.45 µm cartridge system. To prevent and evaluate potential contamination, the equipment was soaked in a two percent nitric acid solution between usages, and rinsed three times in DI water. The new filters were conditioned at the time of sampling by allowing the first 10 ml of water passed through to be discarded before the remaining sample was collected. Approximately quarterly, filter blanks were collected using the Regional Board laboratory DI water and processing it through the standard equipment used in the field.

Only data from sample sets whose blind QA/QC met specifications outlined in **Table 3** have been included in this report.

RAINFALL AND DISCHARGE PATTERNS

The San Joaquin River Index, as described in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (SWRCB, 1995) is used to classify water year type in the river basin based on unimpaired runoff. The 60-20-20 Index includes one “wet” classification, two “normal” classifications (above and below normal), and two “dry” classifications (dry and critical), for a total of five water year types. Water year 1999 was classified as “above normal” with a runoff of approximately 3.6 million acre feet and Water Year 2000 as “above normal” with a runoff of approximately 3.4 million acre feet.

Figure 2. Flows in Mud Slough (north) and Salt Slough as Compared to Rainfall at Kesterson National Wildlife Refuge: Water Years 1999 and 2000

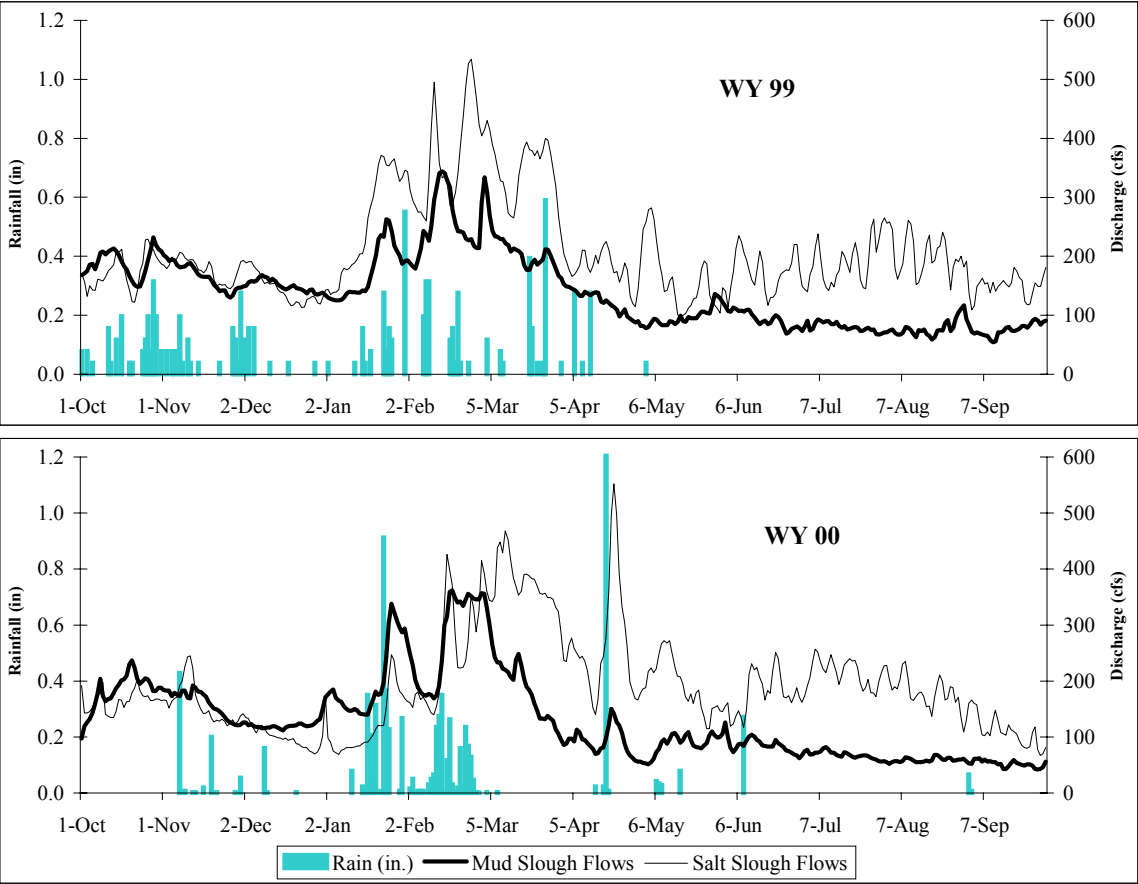
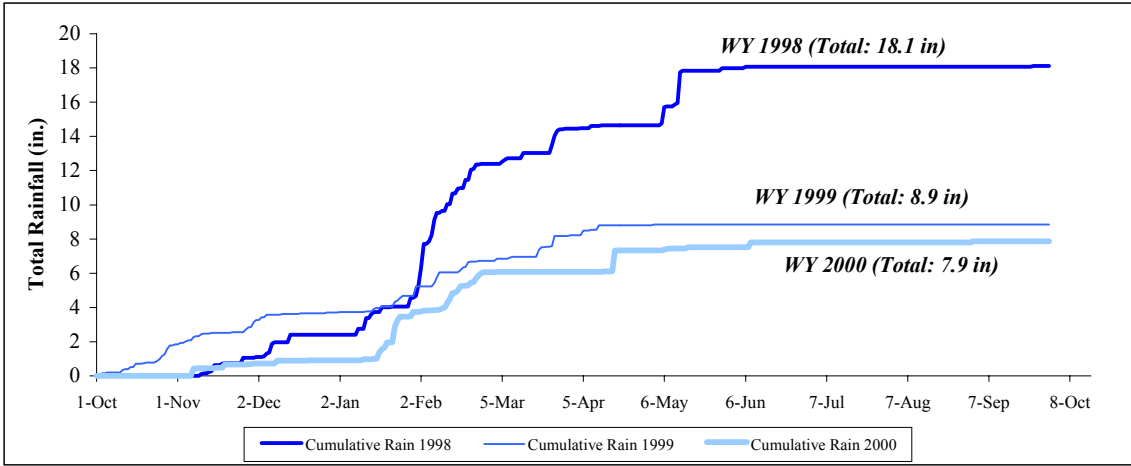


Figure 3. Comparison of Cumulative Rainfall at Kesterson National Wildlife Refuge: Water Years 1998, 1999 and 2000.



Mud Slough (north) and Salt Slough are the main water bodies that drain the Grassland Watershed. **Figure 2** compares daily flows in both sloughs to the monthly rainfall at the CIMIS³ station located in Kesterson National Wildlife Refuge (NWR) for Water Years 1999 and 2000. Rainfall events occurred fairly consistently throughout the first half of Water Year 1999 and in January and February of Water Year 2000 although the majority of storms produced less than 0.4 inches of rainfall. The consistent minor storms that occurred during Water Years 1999 and 2000 were in sharp contrast to the distinct major storm events of Water Year 1998 which caused record high monthly rainfall totals and internal flooding. A comparison of the cumulative rainfall at Kesterson for Water Years 1998-2000 is presented in **Figure 3**.

RESULTS

Grab sample water quality results for minerals and trace elements, as well as EC, pH, and temperature at time of sampling, are listed by site in Appendices A and B. Appendix A includes grab data for sites sampled during Water Years 1999 and 2000; Appendix B lists all information collected using automated Sigma samplers at the San Luis Drain discharge and the automated samplers used at the inflow to the San Luis Drain. The number of sampling events and the ranges, mean and median values for each measured constituent at each site are shown in these appendices. Median results are summarized below (**Table 4**).

Table 4. Median Constituent Concentrations for Waterways within the Grassland Watershed: Water Years 1999-2000.

<u>WY 1999</u>		EC	B	Cl	SO4	TSS	Se	Mo	Cr	Cu	Ni	Pb	Zn	Hardness	
Type	Station	umhos/cm	mg/L				ug/L								mg/L
I	Agatha Canal	419	0.24	-	-	-	1.1	-	-	-	-	-	-	-	
I	Camp 13	459	0.37	-	-	-	1.3	-	-	-	-	-	-	-	
T	CCID Main	392	0.22	-	-	-	1.2	-	-	-	-	-	-	-	
T	Santa Fe Canal @ weir	1150	1.6	-	-	-	1.6	-	-	-	-	-	-	-	
T	San Luis Canal @ splits	629	0.49	-	-	-	1.9	-	-	-	-	-	-	-	
O	Salt Slough @ Lander	1210	0.61	156	177	112	0.8	8	4	5	7	<5	19	250	
D	Inflow to San Luis Drain @ Ck 17	5060	7.8	-	-	64	61.5	-	-	-	-	-	-	-	
D	San Luis Drain @ Terminus	4740	7.2	580	1500	47	54.1	28	7	4	4	<5	<2	1075	
B	Mud Slough (n) Upstream of SLD	1430	1.2	150	200	-	0.7	8	7	6	12	<5	18	268	
O	Mud Slough (n) Dwnstrm of SLD	2730	3.5	300	555	67	22.0	13	5	4	8	<5	6	480	
A	San Luis Drain @ Terminus*	4765	7.4	-	-	-	54.3	-	-	-	-	-	-	-	
A	Inflow to San Luis Drain @ Ck 17**	4940	7.6	-	-	-	64.1	-	-	-	-	-	-	-	

<u>WY 2000</u>		EC	B	Cl	SO4	TSS	Se	Mo	Cr	Cu	Ni	Pb	Zn	Hardness	
Type	Station	umhos/cm	mg/L				ug/L								mg/L
I	Agatha Canal	542	0.30	-	-	-	1.0	-	-	-	-	-	-	-	
I	Camp 13	595	0.41	-	-	-	1.3	-	-	-	-	-	-	-	
T	CCID Main	467	0.24	-	-	-	1.1	-	-	-	-	-	-	-	
T	Santa Fe Canal @ weir	1150	1.4	-	-	-	1.3	-	-	-	-	-	-	-	
T	San Luis Canal @ splits	849	0.69	-	-	-	1.6	-	-	-	-	-	-	-	
O	Salt Slough @ Lander	1320	0.71	170	150	-	0.9	9	4	5	7	<5	12	240	
D	Inflow to San Luis Drain @ Ck 17	4620	7.6	-	-	85	67.3	-	-	-	-	-	-	-	
D	San Luis Drain @ Terminus	4480	7.1	495	1400	55	47.9	27	6	4	3	<5	<2	1035	
B	Mud Slough (n) Upstream of SLD	1610	1.3	145	153	-	0.7	8	4	4	8	<5	5	260	
O	Mud Slough (n) Dwnstrm of SLD	2660	3.4	310	775	-	20.5	17	5	4	7	<5	3	630	
A	San Luis Drain @ Terminus*	4420	7.1	-	-	-	49.8	-	-	-	-	-	-	-	
A	Inflow to San Luis Drain @ Ck 17**	4550	7.5	-	-	-	55.1	-	-	-	-	-	-	-	

- : Not analyzed

* Autosampler daily composite data for EC, B and Se only

** Autosampler weekly composite data for EC, B and Se only

I = Inflow

T = Internal Flow

O = Outflow

B = Background

D = Agricultural drainage

A = Automated Sampler

³ CIMIS stands for California Irrigation Management Information System. Stations are located throughout California and maintained by the California Department of Water Resources.

Table 5. Annual Minimum, Mean, and Maximum Electrical Conductivity, Boron, and Selenium at Monitoring Sites Within the Grassland Watershed: Water Years 1986-1996, 97, 98, 99 and 2000.

Site	Count	EC (umhos/cm)			Boron (mg/L)			Selenium (ug/L)		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Wetland Supply and Internal Channels										
Agatha Canal										
WYs 86-96 (Pre-project; All)	241	162	3070	8100	0.07	4.9	20	0.8	35.9	120
WYs 86-96 (Pre-project; Dry years only)	153	430	3312	8100	0.07	5.4	20	0.8	37.6	114
WYs 86-96 (Pre-project; Wet Years only)	86	162	2650	6600	0.12	4.1	15.3	0.9	33.0	120
WY 97 (Wet)	43	187	518	4240	0.11	0.25	0.46	0.5	1.3	3.4
WY 98 (Wet)	52	66	875	3370	<0.05	1.3	6.1	<0.4	4.0	40.4
WY 99 (Above Normal)	52	141	602	2130	0.12	0.70	4.1	<0.4	1.4	6.4
WY 00 (Above Normal)	52	187	582	1330	0.16	0.43	1.9	<0.4	1.1	2.3
Camp 13 Slough										
WYs 86-96 (Pre-project; All)	269	266	3580	6700	0.13	5.0	10.3	0.8	52.6	144
WYs 86-96 (Pre-project; Dry years only)	185	390	3690	6700	0.22	5.1	10.3	1.0	53.1	123
WYs 86-96 (Pre-project; Wet Years only)	83	266	3330	6510	0.13	4.8	9.3	0.8	51.5	144
WY 97 (Wet)	42	172	822	3760	0.15	1.1	7.1	0.6	2.6	23.4
WY 98 (Wet)	51	64	1430	6610	<0.05	2.6	13	<0.4	2.4	11.5
WY 99 (Above Normal)	52	144	520	1480	0.14	0.49	1.9	<0.4	1.6	6.8
WY 00 (Above Normal)	52	336	672	2360	0.15	0.59	3.5	<0.4	1.3	2.8
CCID Main Canal										
WYs 86-96 (Pre-project; All)	214	50	686	3790	0.02	0.40	5.1	<0.4	1.9	16.0
WYs 86-96 (Pre-project; Dry years only)	176	55	719	3790	0.10	0.40	5.1	<0.4	1.9	5.2
WYs 86-96 (Pre-project; Wet Years only)	37	50	572	2100	<0.05	0.41	2.7	0.6	1.9	16.0
WY 97 (No data available)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WY 98 (Wet - Feb. through Sept. only)	34	43	279	1000	<0.05	0.22	1.1	<0.4	1.5	3.9
WY 99 (Above Normal)	52	101	378	629	0.06	0.23	0.42	<0.4	1.4	3.2
WY 00 (Above Normal)	52	89	521	1290	<0.05	0.26	0.52	<0.4	1.1	2.3
Santa Fe Canal @ Henry Miller Road										
WYs 93-96 (Pre-project; All)	99	188	1230	4090	0.10	1.3	5.4	<0.4	6.7	59.8
WYs 93-96 (Pre-project; Dry years only)	40	410	1170	4090	0.22	1.1	5.3	<0.4	6.2	59.8
WYs 93-96 (Pre-project; Wet Years only)	59	188	1270	3930	0.10	1.4	5.4	0.6	7.0	44.0
WY 97 (Wet)	42	339	941	1870	0.24	1.0	2.9	0.8	2.1	3.9
WY 98 (Wet)	51	341	1150	2420	0.20	1.5	4.2	0.7	2.4	13.0
Santa Fe Canal @ weir										
WY 99 (Above Normal)	52	514	1300	2580	0.34	1.7	3.8	0.8	1.6	2.5
WY 00 (Above Normal)	52	443	1370	2670	0.27	1.6	3.9	0.5	1.4	2.5
San Luis Canal @ Henry Miller Road										
WYs 93-96 (Pre-project; All)	126	196	1620	4850	0.10	1.9	7.4	0.7	14.0	74.0
WYs 93-96 (Pre-project; Dry years only)	50	484	1220	4010	0.30	1.2	4.9	0.7	7.0	56.6
WYs 93-96 (Pre-project; Wet Years only)	76	196	1880	4850	0.10	2.4	7.4	0.8	18.6	74.0
WY 97 (Wet)	41	501	973	1840	0.36	1.1	3.3	1.0	2.1	6.2
WY 98 (Wet)	52	350	1220	2560	0.24	1.7	4.5	0.8	2.5	10.5
San Luis Canal @ splits										
WY 99 (Above Normal)	52	116	740	2170	0.09	0.7	2.7	<0.4	1.9	3.2
WY 00 (Above Normal)	52	388	921	2430	0.16	0.84	3.2	<0.4	1.6	3.6
Salt Slough @ Lander Ave.										
WYs 86-96 (Pre-project; All)	516	780	2210	4050	0.30	2.1	5.0	0.5	15.0	44.0
WYs 86-96 (Pre-project; Dry years only)	351	1020	2230	4050	0.30	2.0	4.7	0.6	14.6	44.0
WYs 86-96 (Pre-project; Wet Years only)	163	780	2170	3970	0.43	2.2	5.0	0.5	15.8	42.0
WY 97 (Wet)	48	922	1370	2000	0.40	0.8	1.8	0.5	1.0	3.4
WY 98 (Wet)	52	557	1440	2730	0.21	0.89	1.9	0.4	1.2	5.1
WY 99 (Above Normal)	52	832	1250	1850	0.36	0.68	1.4	<0.4	0.8	1.5
WY 00 (Above Normal)	52	874	1430	2370	0.41	0.81	1.7	<0.4	0.8	1.7

Table 5 continued on next page

Table 5. (Continued from previous page)

Site	Count	EC (umhos/cm)			Boron (mg/L)			Selenium (ug/L)		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
San Luis Drain and Mud Slough (N)										
Inflow to San Luis Drain @ Check 17										
WY 97 (Wet)	48	2620	4460	5600	4.2	7.3	9.0	17.9	65.9	108
WY 98 (Wet)	52	2040	4730	6230	3.3	7.7	11	19.2	70.4	133
WY 99 (Above Normal)	52	3510	5040	6680	5.4	7.8	11	36.9	65.2	104
WY 00 (Above Normal)	52	3330	4640	5760	NA	NA	NA	NA	NA	NA
San Luis Drain @ Terminus										
WY 97 (Wet)	48	2720	4270	5460	4.4	6.8	8.4	17.0	59.3	107
WY 98 (Wet)	53	2950	4780	6070	4.4	7.7	9.9	34.0	66.6	120
WY 99 (Above Normal)	53	3210	4750	5920	4.6	7.2	9.3	21.6	59.5	122
WY 00 (Above Normal)	52	3140	4439	5600	5.0	7.0	8.4	25.7	52.6	99.3
Mud Slough (N) upstream of SLD										
WY 97 (Wet)	48	744	1390	2960	0.56	1.2	2.9	<0.4	0.8	1.7
WY 98 (Wet)	51	595	1300	3170	0.47	1.3	3.3	<0.4	1.0	1.9
WY 99 (Above Normal)	53	657	1420	2300	0.48	1.3	2.2	<0.4	0.9	2.6
WY 00 (Above Normal)	52	620	1540	2620	0.42	1.3	2.3	<0.4	0.8	2.4
Mud Slough (N) @ San Luis Drain										
WYs 91-96 (Pre-project; All)	338	588	3100	10,860	0.20	2.7	8.7	<0.4	6.9	59.0
WYs 91-96 (Pre-project; Dry years only)	190	660	3870	10,860	0.20	3.4	7.9	<0.4	10.3	50.0
WYs 91-96 (Pre-project; Wet Years only)	147	588	2110	7250	0.27	1.6	8.7	<0.4	2.4	59.0
WY 97 (Wet)	46	1150	2870	4930	1.1	4.1	6.8	5.0	30.7	79.6
WY 98 (Wet)	52	1100	2720	5340	1.1	3.8	8.9	3.1	26.6	104
WY 99 (Above Normal)	53	1410	2820	4360	1.8	3.8	7.7	6.6	23.0	50.7
WY 00 (Above Normal)	52	1320	2790	4910	1.4	3.9	7.7	3.7	22.0	66.0
Autosampler Data										
San Luis Drain @ Terminus										
WY 97 (Wet)	344	2620	4390	5880	4.1	7.0	9.3	15.2	62.4	116
WY 98 (Wet)	363	2430	4790	6330	1.4	7.8	11	20.2	66.9	134
WY 99 (Above Normal)	363	3300	4780	6140	5.2	7.4	9.5	21.1	59.1	121
WY 00 (Above Normal)	364	3160	4469	5750	4.6	7.1	9.1	22.7	54.2	104
Inflow to San Luis Drain @ Check 17										
WY 99 (Above Normal)	52	3490	4960	6870	5.9	7.7	9.6	36.5	66.8	117
WY 00 (Above Normal)	52	3210	4582	5870	5.9	7.5	9.1	26.1	62.3	104

Count = the minimum number of analyses out of the three constituents

Water year type is based on the San Joaquin 60-20-20 River Index as follows:

Critical Water Year: Runoff < 2.1 million ac-ft (WYS 87-92 and 94)

Wet Water Year: Runoff > 3.81 million ac-ft (WYS 86, 93 and 95-98)

Above Normal Water Year: Runoff > 3.1 million ac-ft and < 3.8 million ac-ft (WYS 99 and 00)

Salt, Boron and Selenium

Data for Water Years 1999 and 2000 has been divided into results for the San Luis Drain and Mud Slough (north), and wetland water supply channels and Salt Slough. Also presented is data from the autosamplers that collected either daily or weekly composites depending on the site. **Table 4** lists the median constituent concentrations for all water bodies monitored in the Grassland Watershed during Water Years 1999 and 2000. **Table 5** summarizes annual minimum, mean and maximum EC, boron and selenium concentrations at locations sampled in the watershed during this period and compares those values to the average range in concentration prior to and after the Grassland Bypass Project. Pre-Project (Water Years 1986 to 1996) records contained seven critically dry years and four wet years as determined using the San Joaquin River Index (SWRCB, 1995). The summary information for the previous data record is presented in full and has also been separated into critically dry years and wet years. Post-Project Water Years 1997 and 1998 (both wet years) have also been presented. Additional information on water quality parameters measured is contained in Appendix A.

San Luis Drain and Mud Slough (north)

Grab samples were collected both from the inflow to and discharge from the San Luis Drain and also from Mud Slough (north) upstream and downstream of the discharge from the San Luis Drain. In addition to EC, boron, and total selenium, total suspended solids and dissolved selenium were analyzed at both San Luis Drain sites. (Dissolved selenium studies were conducted only during Water Year 1999.) Due to the fact that a weekly composite sample consisting of seven sub-samples is more representative than a weekly grab sample, boron and selenium analyses for the San Luis Drain inflow site were conducted only on the weekly composite of the automated samples, after January 2000.

In addition, using automated sampling equipment, daily composite samples were collected at the discharge from the San Luis Drain during Water Years 1999 and 2000 and were analyzed for EC, boron and selenium. Daily water samples were also collected at the inflow to the San Luis Drain, providing daily electrical conductivity values and weekly composited boron and selenium concentrations, as recorded in Appendix B. Daily EC, boron and selenium concentrations at the discharge from the San Luis Drain site are compared to grab sample data in **Figures 4A and 4B**.

At the San Luis Drain discharge, EC and boron concentrations can vary widely on a daily basis. EC values varied up to 1,000 umhos/cm between days, while boron concentrations varied up to 2 mg/L (Appendix B). However, comparative median EC and boron concentrations between composite and grab samples were consistent, with median EC values of 4770 umhos/cm and 4740 umhos/cm, respectively, and 7.4 mg/L and 7.2 mg/L boron, respectively, for the daily composites and the weekly grab samples in Water Year 1999. The medians were even closer in Water Year 2000 with composite and grab sample EC values of 4420 umhos/cm and 4480 umhos/cm, respectively, and a median of 7.1 mg/L boron for both composite and grab sample data (**Table 4**).

Selenium concentrations showed even greater variability than the EC and boron concentrations, both daily during October through February, and seasonally. Concentrations increased steadily between February and May, peaking in April near 100 ug/L and dropping to near 40 ug/L by July

and August. Although weekly grab samples appear to document the seasonal trends and shifting concentrations, they are unable to detect the potentially large day to day differences noted by the autosampler. Daily variability of selenium concentrations during the months when rainfall events are likely to occur (October through February) appears to be greater than for the remainder of the water year (**Figures 4A and 4B**).

EC, selenium and boron concentrations at the inflow to and discharge from the San Luis Drain were similar for both Water Years 1999 and 2000. **Figures 5A and 5B** compares trends at both sites using weekly grab data. EC and boron concentrations remained fairly consistent over the two year period, with mean values near 4700 umhos/cm and 7.5 mg/L, respectively, for both the inflow and discharge. Selenium concentrations were more variable at both sites, particularly during the non-irrigation months (October through January). The overall highest concentrations are found in March and April at the discharge with a maximum of 122 ug/L on 8 April during Water Year 1999 and 99 ug/L on 30 March during Water Year 2000. In contrast, maximum inflow selenium concentrations occurred in December: 102 ug/l on 22 December (Water Year 1999) and 103 ug/L on 27 December (Water Year 2000).

Discharge from the San Luis Drain had a pronounced impact on Mud Slough (north) (**Figures 6A and 6B**). The higher concentrations downstream of the drainage inflow were particularly pronounced from April through September. For Example, on 5 August 1999, upstream and downstream EC and boron concentrations were recorded at 1860 umhos/cm vs. 4360 umhos/cm and 2.1 mg/L vs. 7.7 mg/L, respectively.

The San Luis Drain discharge also increased downstream Mud Slough (north) selenium concentrations. During Water Year 1999, selenium concentrations in Mud Slough (north) upstream of the discharge reached a maximum of 2.6 ug/L while downstream of the discharge, the mean selenium concentration was 23.0 ug/L with a maximum of 50.7 ug/L. Similarly, in Water Year 2000, selenium in Mud Slough upstream of the drain reached a maximum of 2.4 ug/L while Mud Slough downstream of the drain reached 66.0 ug/L. Increasing downstream concentrations of all constituents correspond to the time period of declining background dilution flows, between April and October (per Figure 2).

A comparison of total versus dissolved selenium concentrations at the two sites is presented in **Table 6**. Concentrations of each sample pair fall within the analytical criteria of acceptable split samples (90-110% recoveries), indicating that the majority of selenium in the drain appears to be in the dissolved (aqueous) form. A statistical analysis confirming this conclusion is presented in SFEI (1999).

Total suspended solids was analyzed on a weekly basis in the inflow to and discharge from the San Luis Drain. Summary results from the analyses are presented in **Table 7** and **Figure 7**. Complete analytical results are listed in Appendix A. Total suspended solids concentrations were more variable and generally higher in the inflow to the drain than in the discharge from the drain. Median concentrations in the inflow and discharge were 64 mg/L and 47 mg/L, respectively, in Water Year 1999, and 85 mg/L and 55 mg/L, respectively, in Water Year 2000.

Figure 4A. Comparison of Daily Composite and Weekly Grab Concentrations: Electrical Conductivity, Boron and Selenium in the San Luis Drain at the Terminus and Inflow, Water Year 1999

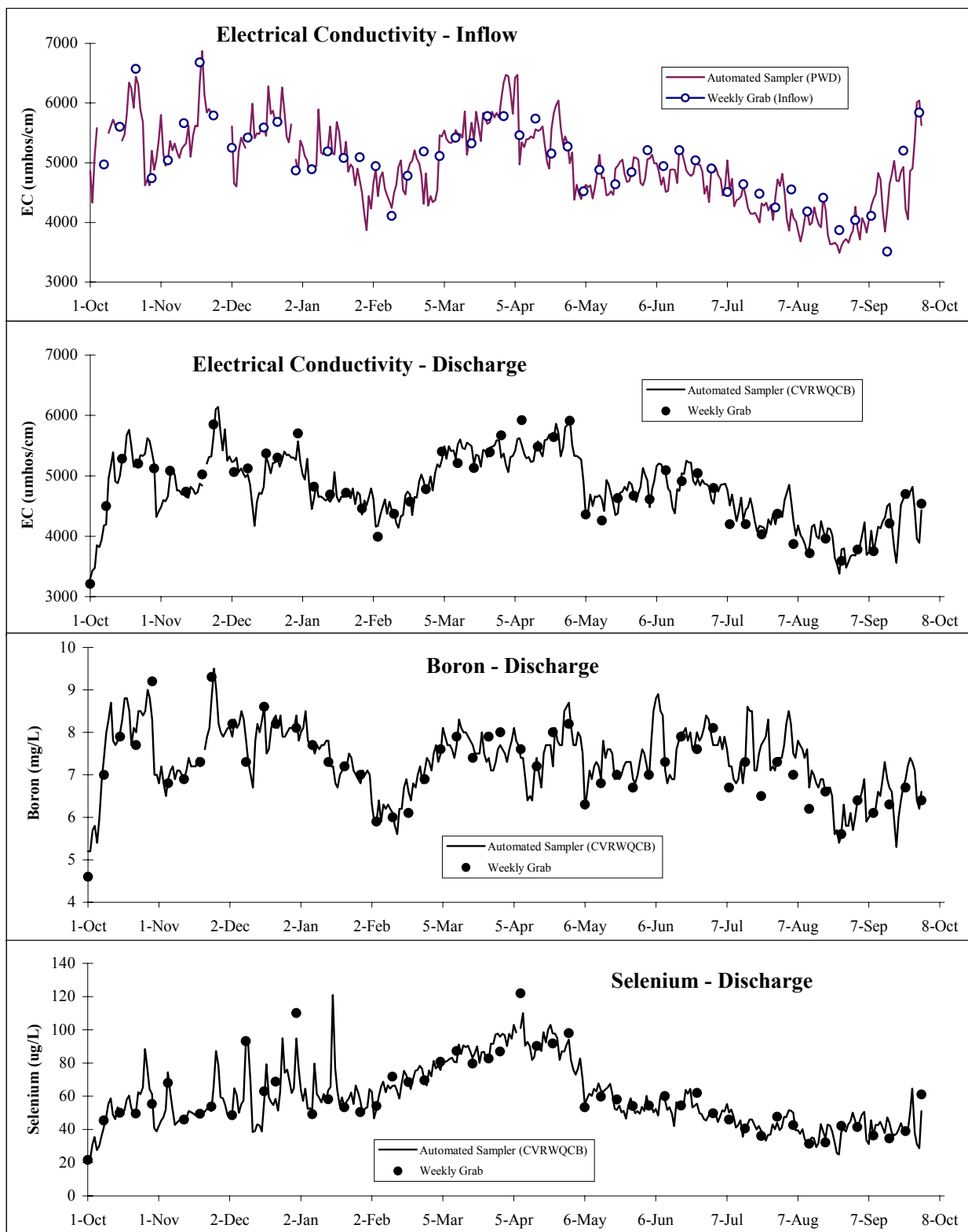


Figure 4B. Comparison of Daily Composite and Weekly Grab Concentrations: Electrical Conductivity, Boron and Selenium in the San Luis Drain at the Terminus and Inflow, Water Year 2000

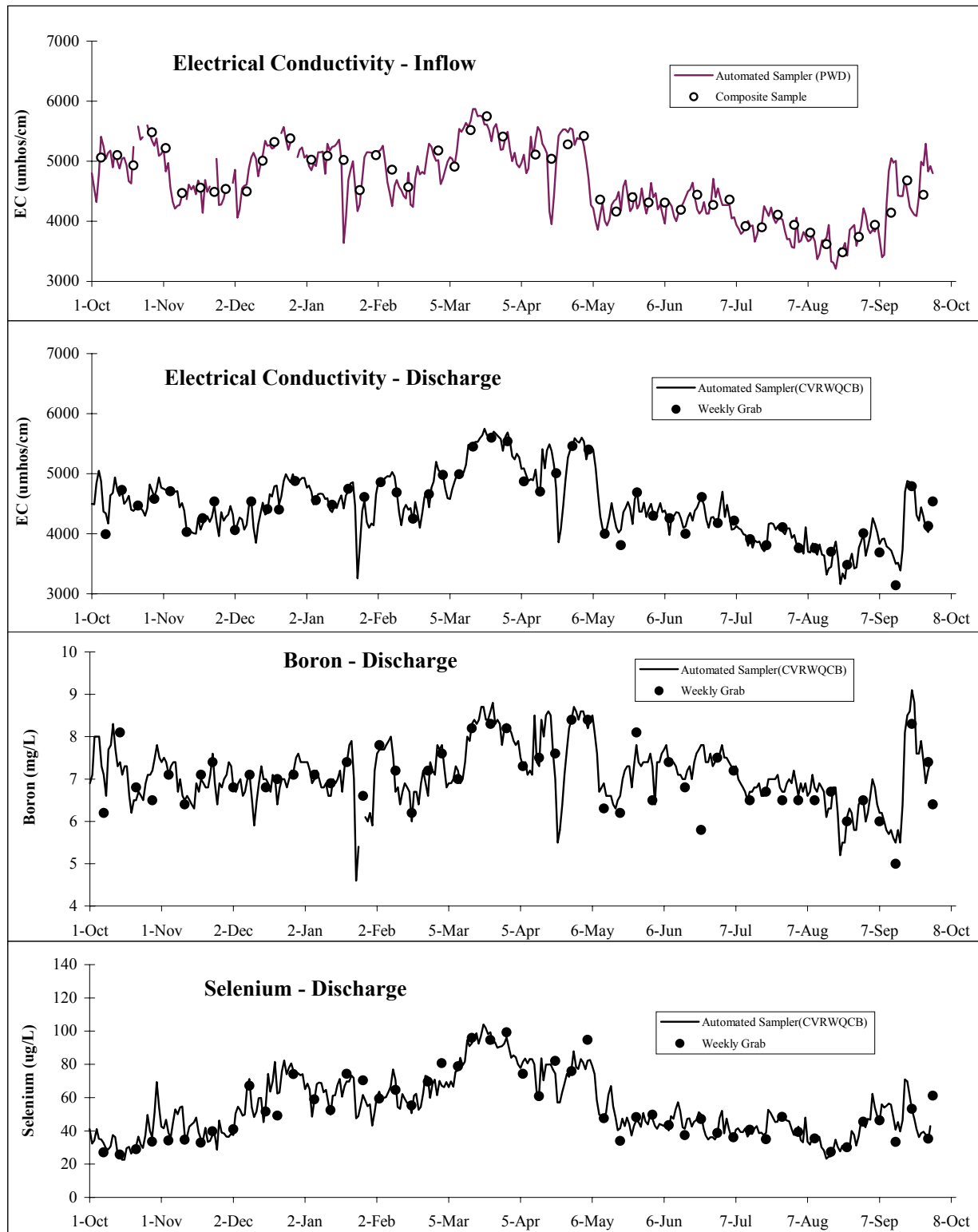


Figure 5A. Electrical Conductivity, Boron and Selenium Concentrations in the Inflow to and Discharge from the San Luis Drain: Water Year 1999 (Weekly data)

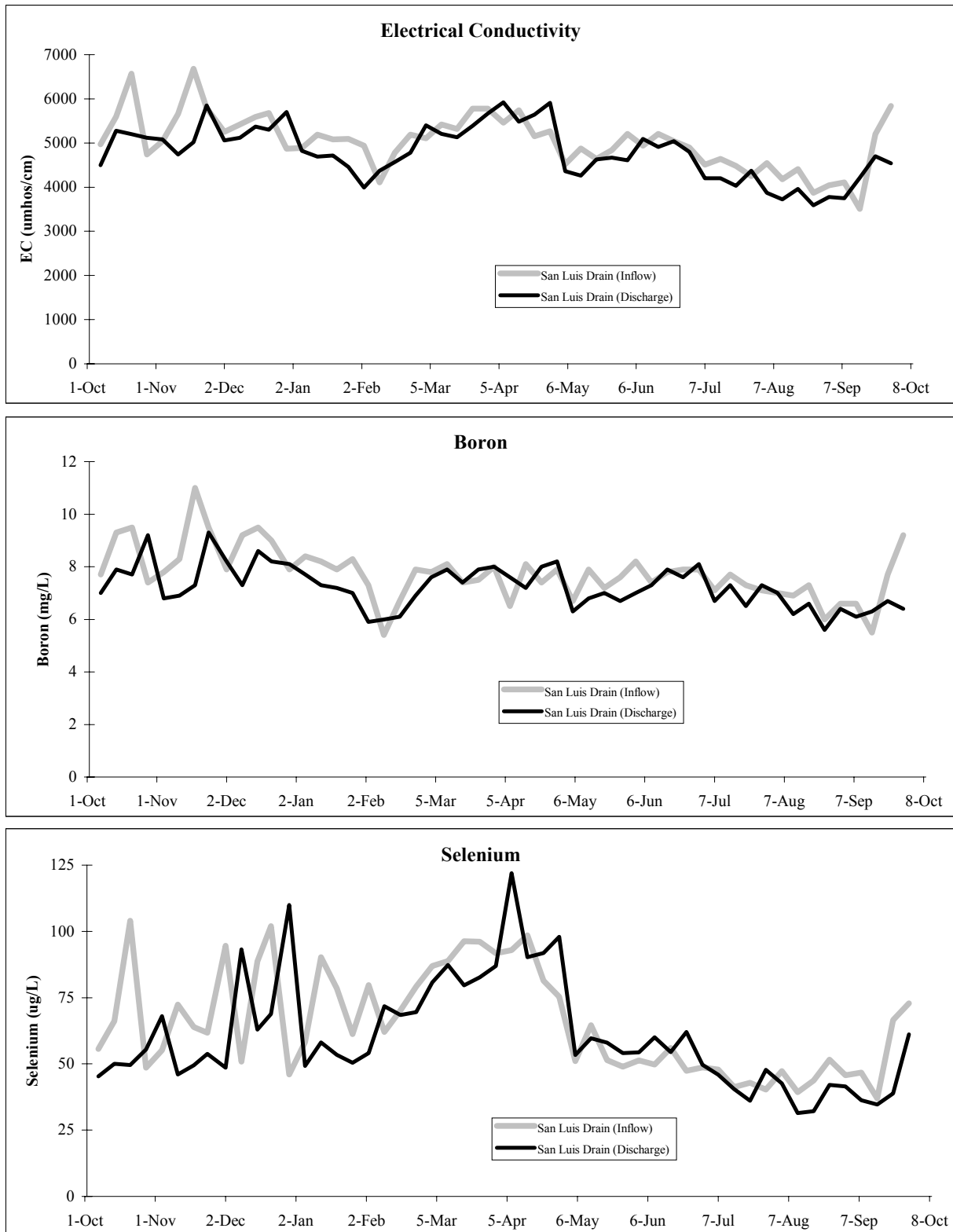


Figure 5B. Electrical Conductivity, Boron and Selenium Concentrations in the Inflow to and Discharge from the San Luis Drain: Water Year 2000 (Weekly data)

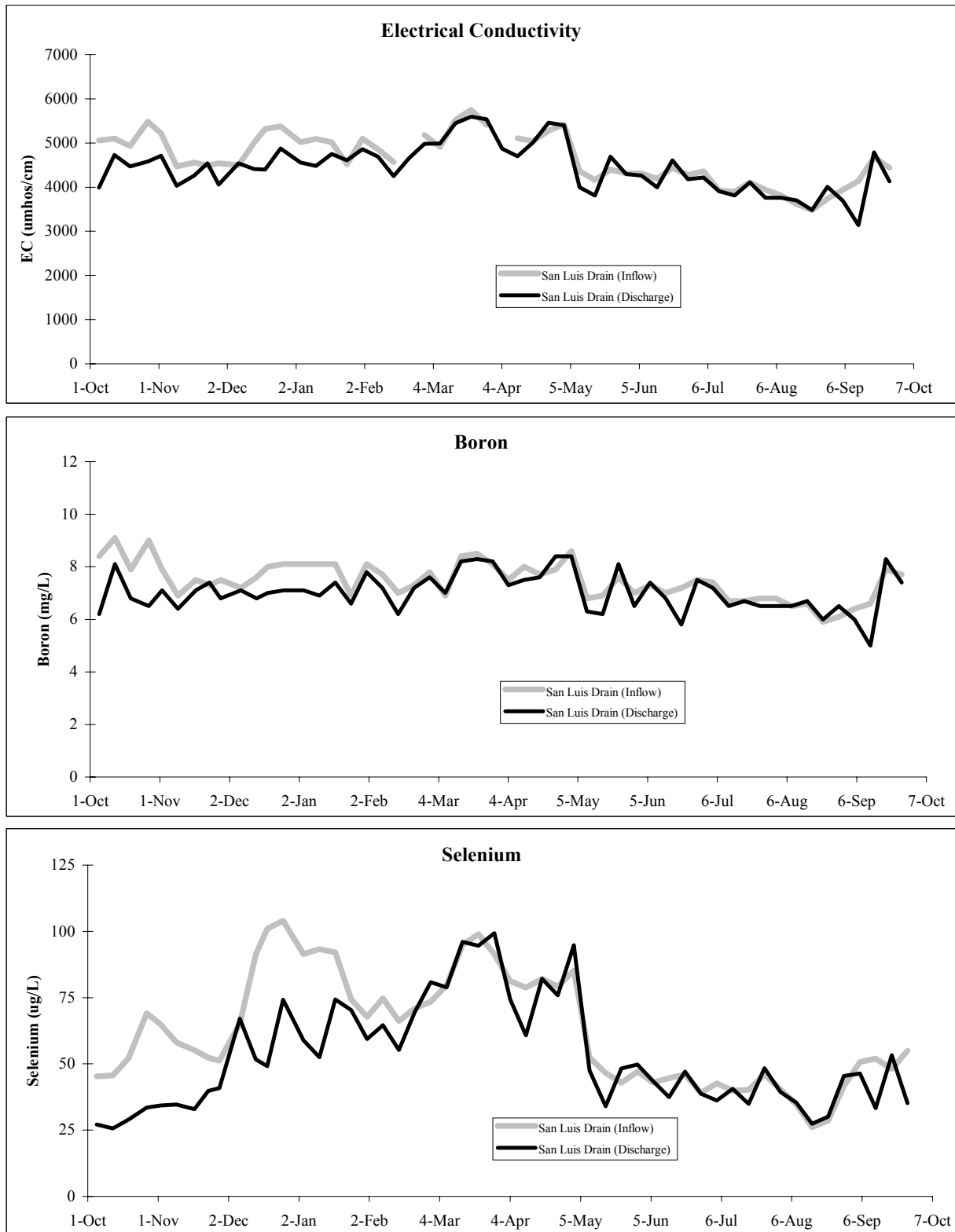


Figure 6A. Electrical Conductivity, Boron and Selenium Concentrations in Mud Slough (north) Upstream and Downstream of the Discharge from San Luis Drain: Water Year 1999 (Weekly data)

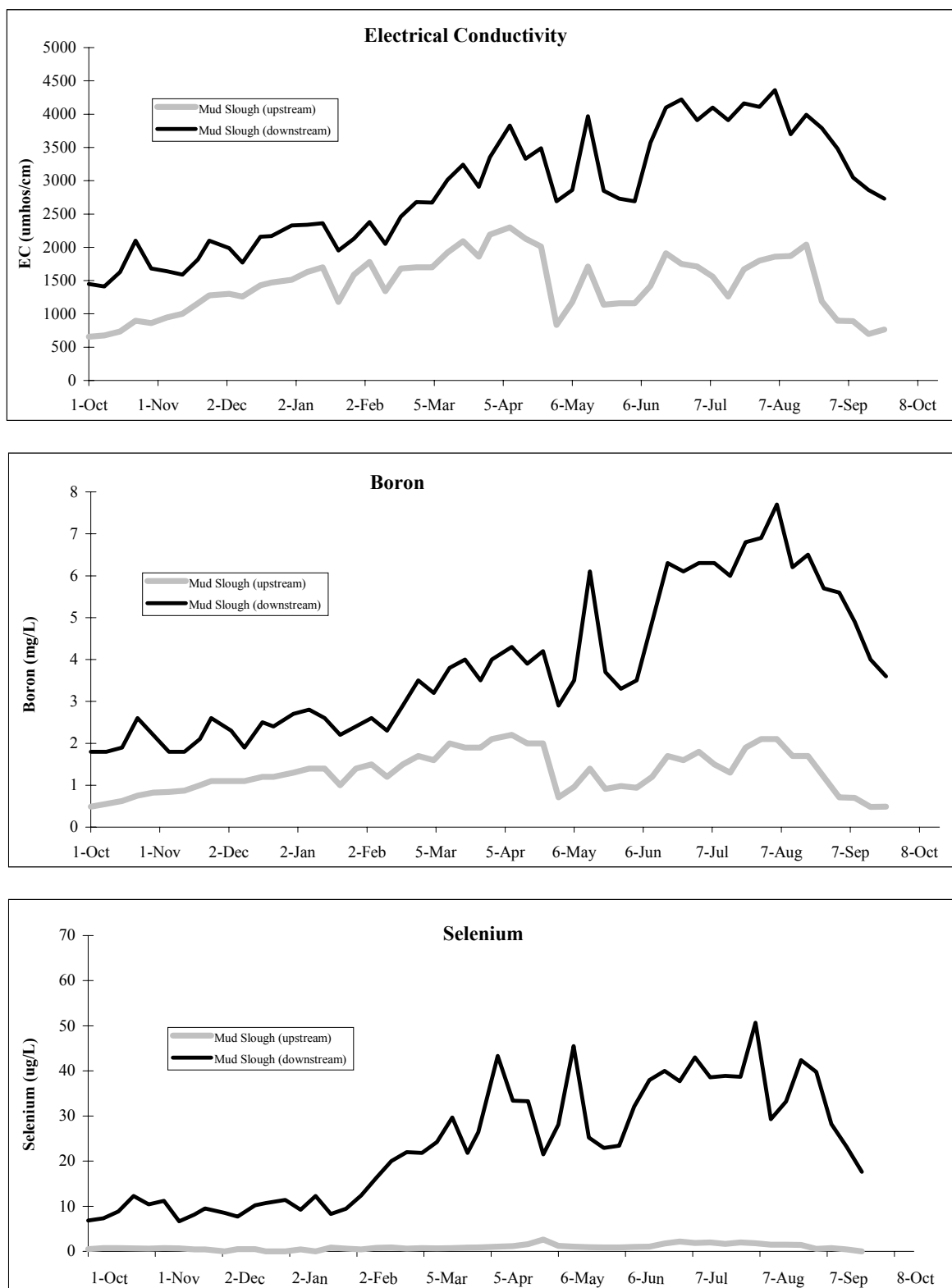


Figure 6B. Electrical Conductivity, Boron and Selenium Concentrations in Mud Slough (north) Upstream and Downstream of the Discharge from San Luis Drain: Water Year 2000 (Weekly data)

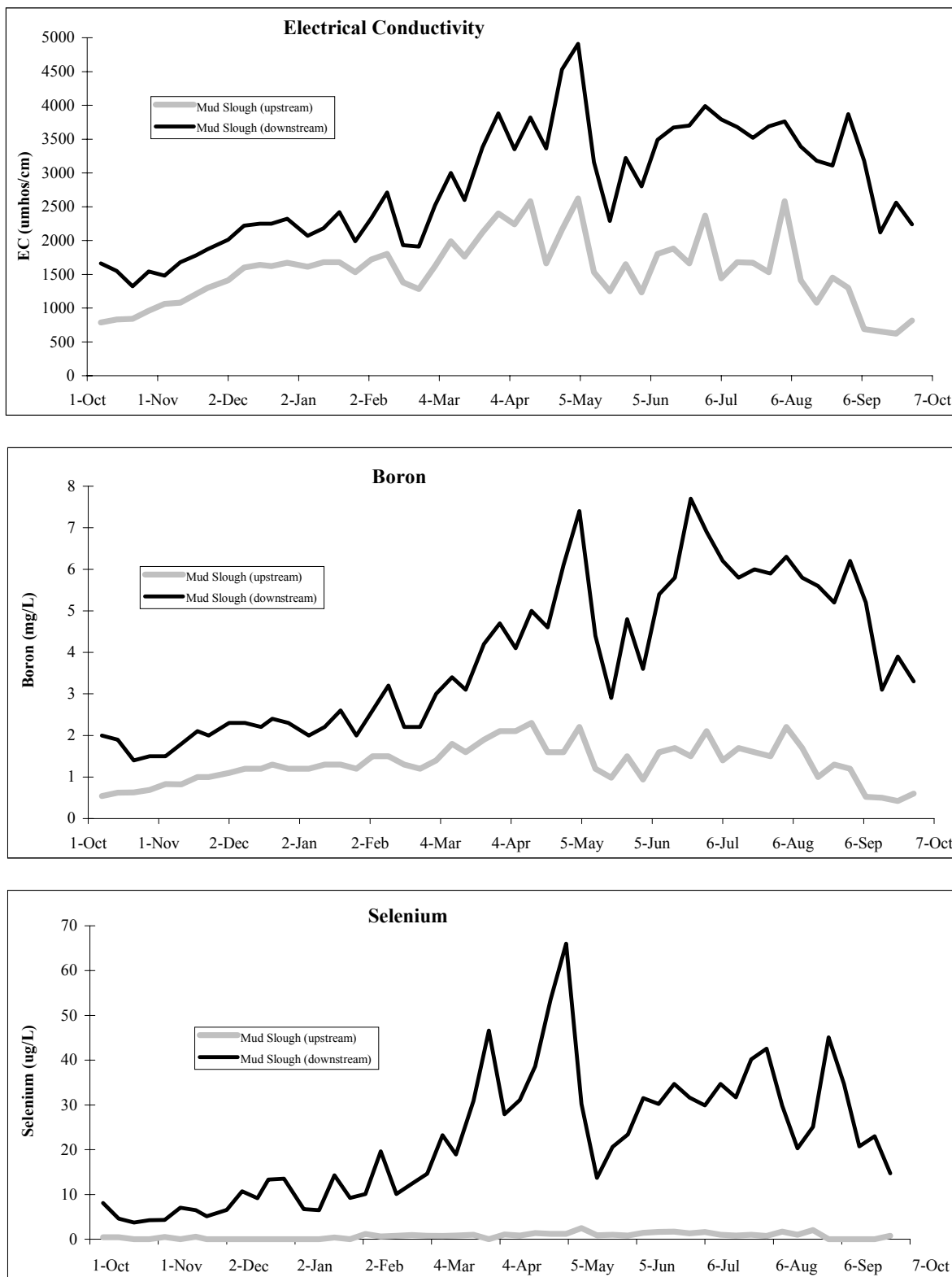


Table 6. Total vs Dissolved Selenium Concentrations at the Inflow to and Discharge from the San Luis Drain: Water Year 1999

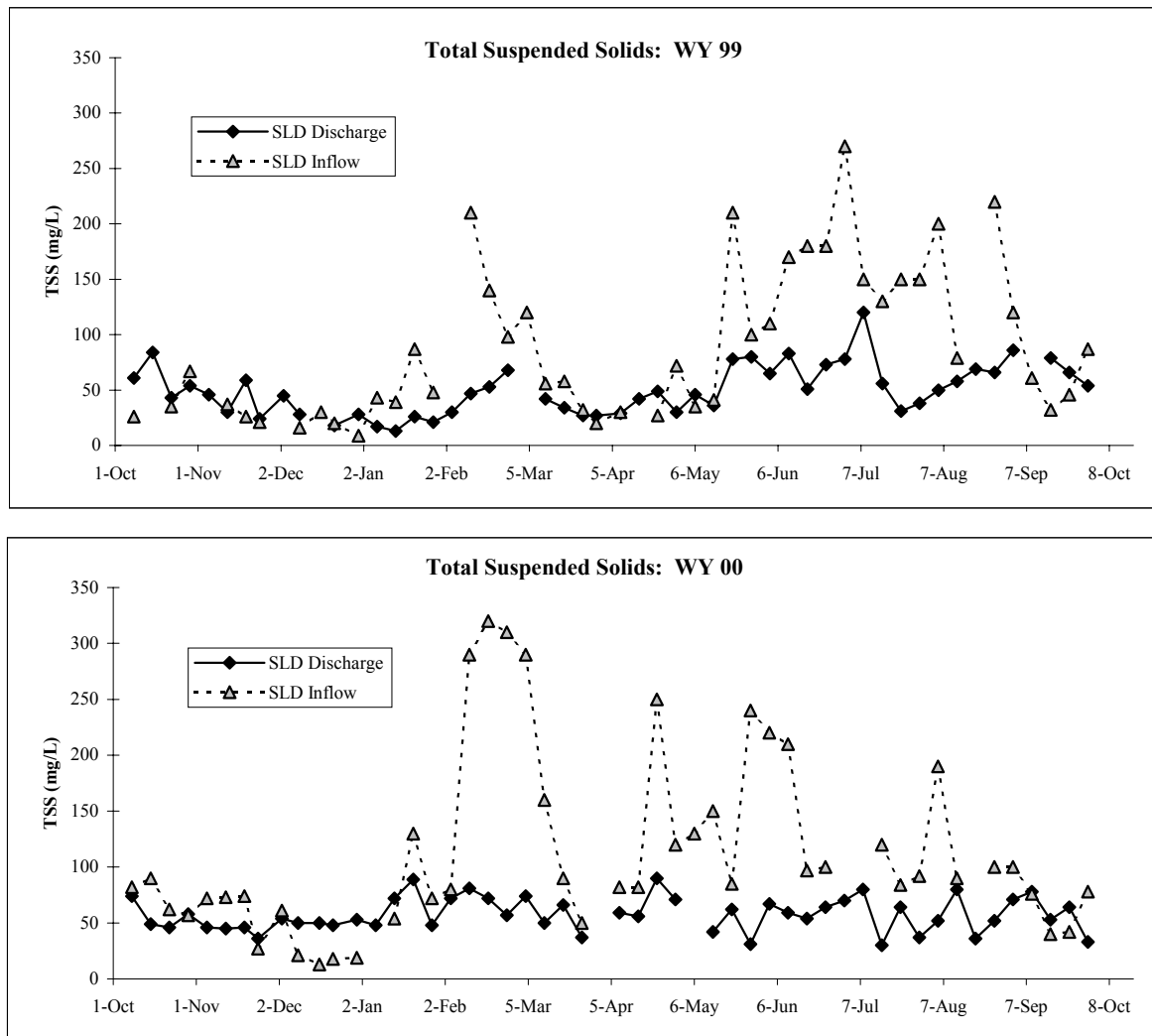
Dates		Selenium Concentration (ug/L)			
Inflow	Outflow	Inflow		Outflow	
		Total	Dissolved	Total	Dissolved
10/07/98	10/08/98	55.6	57.3	45.3	44.1
10/14/98	10/15/98	66.2	64.8	50.0	49.6
10/21/98	10/22/98	104	105	49.6	49.0
10/28/98	10/29/98	48.6	49.2	55.4	55.6
11/04/98	11/05/98	55.2	55.8	68.0	65.0
11/11/98	11/12/98	72.4	73.2	46.0	46.4
11/18/98	11/19/98	63.9	65.7	49.5	50.2
11/24/98	11/24/98	61.8	62.7	53.8	53.9
12/02/98	12/03/98	94.6	78.5	48.6	45.0
12/09/98	12/09/98	50.9	52.7	93.2	92.6
12/16/98	12/17/98	88.7	89.7	63.0	69.8
12/22/98	12/22/98	102	95.9	68.8	67.6
12/30/98	12/31/98	46.0	49.0	110	112
01/06/99	01/07/99	58.2	56.0	49.2	52.1
01/13/99	01/14/99	90.3	88.6	58.1	59.9
01/20/99	01/21/99	78.4	79.7	53.4	54.1
01/27/99	01/28/99	61.2	60.3	50.4	49.0
02/03/99	02/04/99	79.7	82.2	54.1	56.6
02/10/99	02/11/99	62.0	60.9	71.8	68.7
02/17/99	02/18/99	70.2	70.6	68.5	69.5
02/24/99	02/25/99	79.2	79.1	69.6	68.1
03/03/99	03/04/99	87.0	81.2	80.7	79.3
03/10/99	03/11/99	88.8	80.9	87.3	80.2
03/17/99	03/18/99	96.3	92.5	79.6	80.6
03/24/99	03/25/99	96.1	88.2	82.7	81.1
03/31/99	03/30/99	91.7	90.0	87.0	88.4

Dates		Selenium Concentration (ug/L)			
Inflow	Outflow	Inflow		Outflow	
		Total	Dissolved	Total	Dissolved
04/07/99	04/08/99	92.9	86.8	122	124
04/14/99	04/15/99	98.5	94.3	90.3	93.4
04/21/99	04/22/99	81.4	80.2	91.8	90.0
04/28/99	04/29/99	75.3	74.6	98.0	98.4
05/05/99	05/06/99	51.0	50.9	53.3	52.1
05/12/99	05/13/99	64.6	60.3	59.7	58.3
05/19/99	05/20/99	51.4	51.7	58.0	60.1
05/26/99	05/27/99	48.9	51.2	54.1	53.9
06/02/99	06/03/99	51.3	50.9	54.3	54.0
06/09/99	06/10/99	49.8	49.8	60.0	59.3
06/16/99	06/17/99	56.0	55.4	54.4	55.8
06/23/99	06/24/99	47.4	48.4	62.0	57.6
06/30/99	07/01/99	48.7	48.0	49.7	49.4
07/07/99	07/08/99	47.8	47.2	45.9	43.4
07/14/99	07/15/99	41.2	42.3	40.5	38.6
07/21/99	07/22/99	42.9	39.9	36.1	35.8
07/18/99	07/29/99	40.3	40.8	47.7	48.9
08/04/99	08/05/99	47.3	43.9	42.6	40.5
08/11/99	08/12/99	39.3	39.0	31.4	29.5
08/18/99	08/19/99	43.7	45.2	32.2	30.8
08/15/99	08/26/99	51.6	49.3	42.1	38.3
09/01/99	09/02/99	45.7	48.0	41.5	41.7
09/08/99	09/09/99	46.7	46.1	36.3	36.3
09/15/99	09/16/99	36.9	37.8	34.6	36.7
09/22/99	09/23/99	66.5	68.3	38.9	39.1
09/29/99	09/30/99	72.9	70.9	61.1	60.9

Table 7. Summarized Total Suspended Solids Data for the Inflow to and Discharge from the San Luis Drain: Water Years 1999 and 2000

Location	Total Suspended Sediment (mg/L)					
	Count	Min	Max	Mean	Geo Mean	Median
San Luis Drain: WY 99						
Inflow to	44	9	270	86	63	60
Discharge from	48	13	120	49	44	46
San Luis Drain: WY 00						
Inflow to	47	13	320	113	88	85
Discharge from	50	30	90	58	55	55

Figure 7. Total Suspended Solids Concentrations in the Inflow to and Discharge from the San Luis Drain: Water Years 1999 and 2000



Wetland Water Supply Channels and Salt Slough

Weekly grab samples were collected at CCID Main Canal, Camp 13 Ditch, and the Agatha Canal, which represent major supply canals for wetland habitat within Grassland Water District. Samples were also collected from the San Luis Canal and Santa Fe Canal upstream of Henry Miller Road, two internal distribution canals supplying water for wetland habitat; and at Salt Slough, a tributary of the San Joaquin River.

In Water Year 1999, concentrations in the Agatha Canal and Camp 13 Slough fluctuated greatly over short time periods but remained similar to each other (**Figure 8A**). Two distinct EC and boron spikes occurred: one during late January and one in mid March. The cause of the elevated values (up to 2000 umhos/cm and 3.5 mg/L boron) is unknown but corresponds to periods of low flow (0-5 cfs) in the two sloughs (GAF memo, 1998), indicating potential impacts from evapoconcentration and/or local groundwater influences. Groundwater concentrations in the area have been recorded at 1600 to 3100 umhos/cm and greater than 4 mg/L boron (Lowry, 1989). During Water Year 2000, the variations were less pronounced and the overall concentrations slightly lower (**Figure 8b**).

Selenium concentrations in the two sloughs also fluctuated to a greater extent in Water Year 1999 than in Water Year 2000, ranging from <0.4 to 6.8 ug/L in Water Year 1999 and from <0.4 to 2.8 in Water Year 2000. While EC and boron correspond inversely with the flow patterns of the channel (increase in flow corresponds to decrease in concentration), selenium concentrations more closely corresponded to concentrations in the CCID Main Canal, a primary water supply channel (**Figure 9**). Causes for selenium concentrations exceeding 2 ug/L in the CCID Main Canal, Camp 13 Drain, and Agatha Canal are being investigated in a separate study (Eppinger *et al.*, 2002).

During Water Year 1999, the site locations for the San Luis and Santa Fe Canals were moved approximately one quarter mile upstream of Henry Miller Road to avoid a location of potential commingling. Concentrations in the canals fluctuated during Water Year 1999, with EC and boron concentrations in the Santa Fe Canal substantially higher than the San Luis Canal from October 1998 through April 1999 (**Figure 10A**). The peak salt and boron concentrations in the Santa Fe Canal occurred during mid-April and dropped off sharply in May. The month of April typically corresponds to a period of maximum wetland water releases and pre-irrigation of agricultural lands. In contrast, the selenium concentrations in the two canals remained fairly consistent. Water Year 2000 repeated trends seen in Water Year 1999 (**Figure 10B**).

Concentrations of EC, boron, and selenium in Salt Slough during Water Years 1999 and 2000 are depicted in **Figure 11**. During Water Year 1999, elevated EC and boron concentrations occurred during April. Maximum EC and boron concentrations (1850 umhos/cm and 1.4 mg/L, respectively) occurred on 8 April 1999. Selenium concentrations during Water Year 1999 remained below 2.0 ug/L with a maximum of 1.5 ug/L on 8 April 1999. Water Year 2000 had slightly higher overall values for EC and boron, with elevated concentrations occurring during January and February and maximum values reaching 2370 umhos/cm EC and 1.7 mg/L boron. Selenium concentrations remained below 2 ug/L.

Figure 8A. Electrical Conductivity, Boron and Selenium Concentrations in Camp 13 Slough and Agatha Canal (Weekly data): Water Year 1999

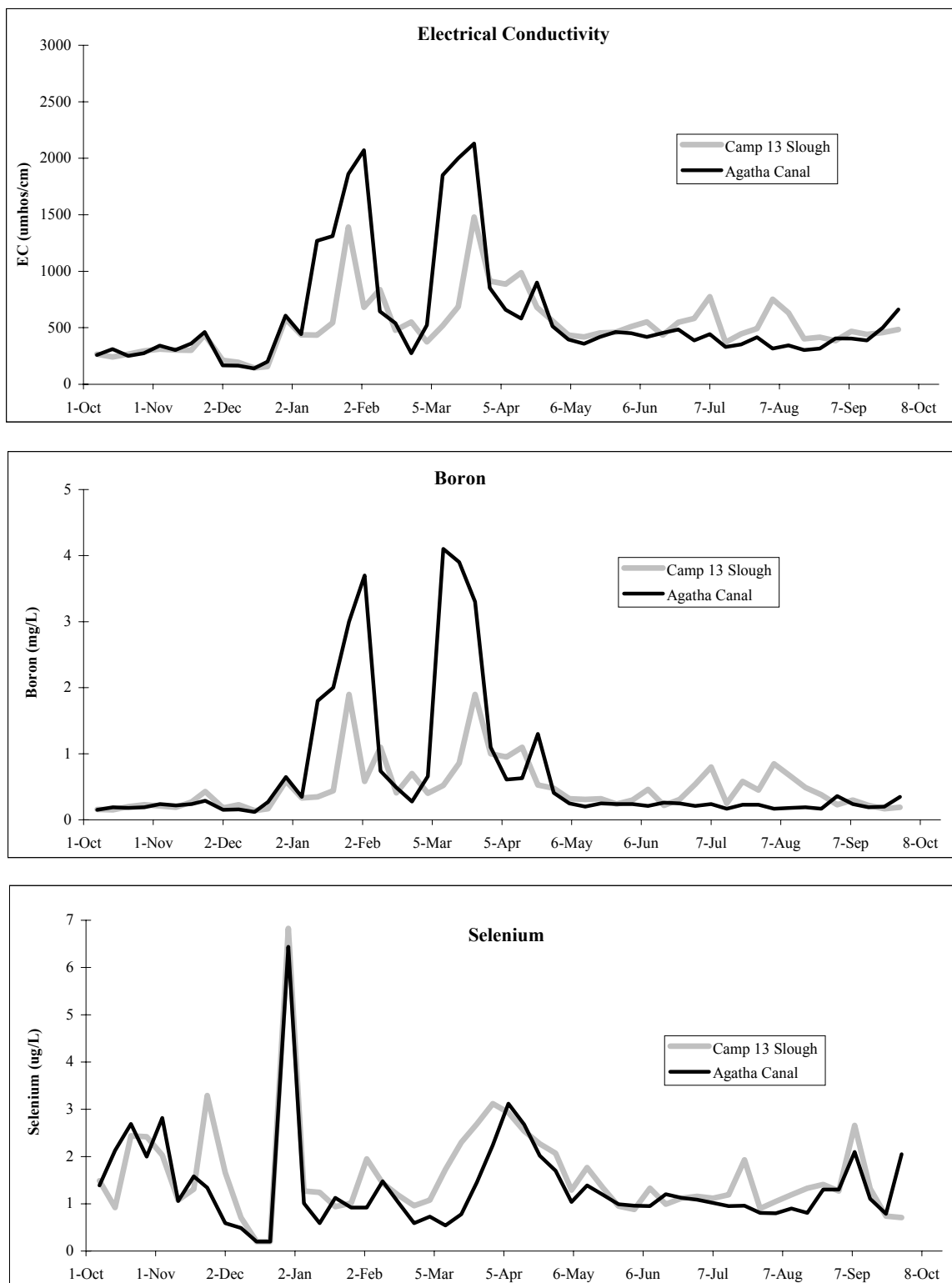
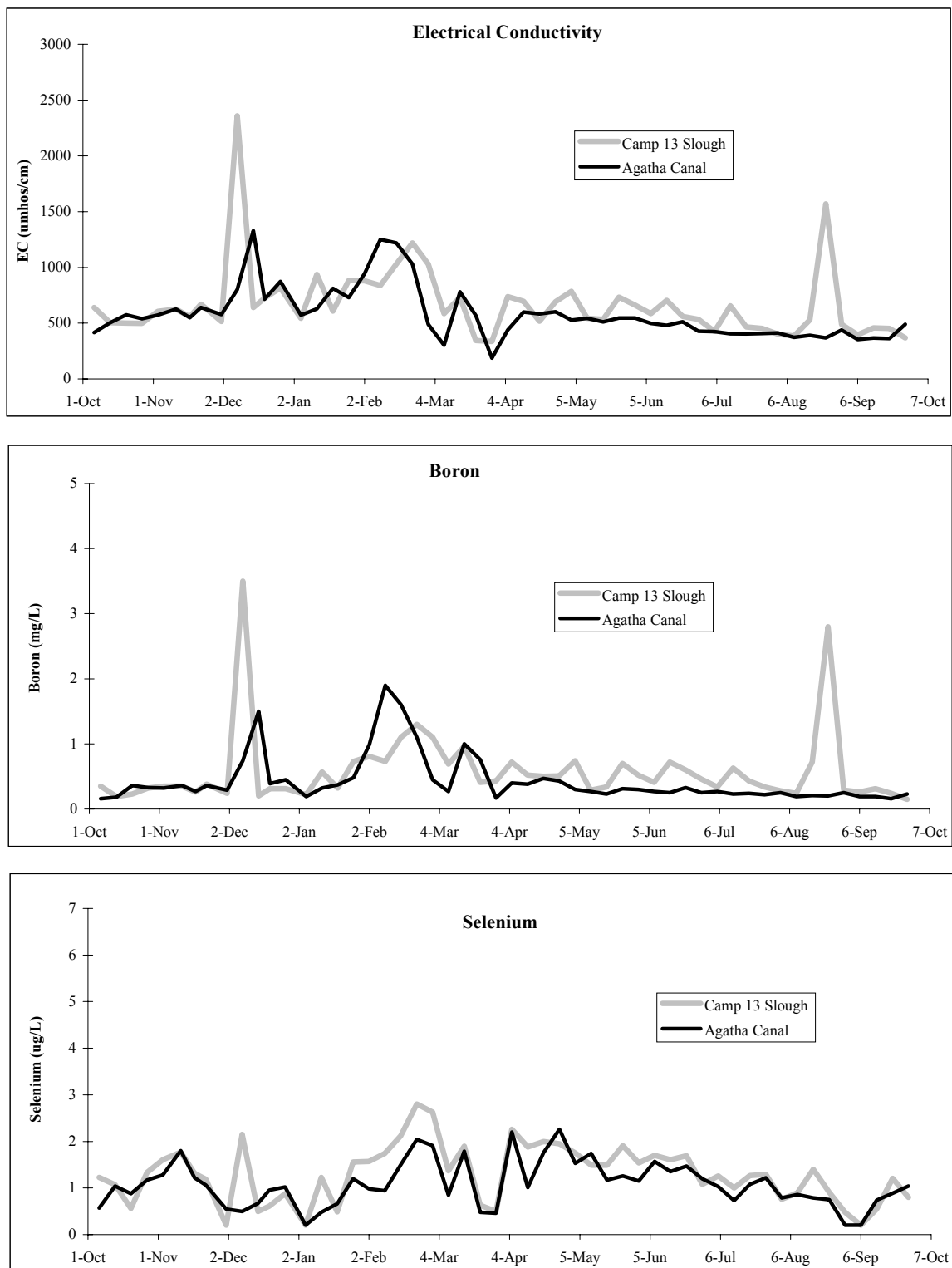


Figure 8B. Electrical Conductivity, Boron and Selenium Concentrations in Camp 13 Slough and Agatha Canal (Weekly data): Water Year 2000



**Figure 9. Selenium Concentrations in CCID Main Canal, Agatha Canal, and Camp 13 Slough:
Water Years 1999 and 2000**

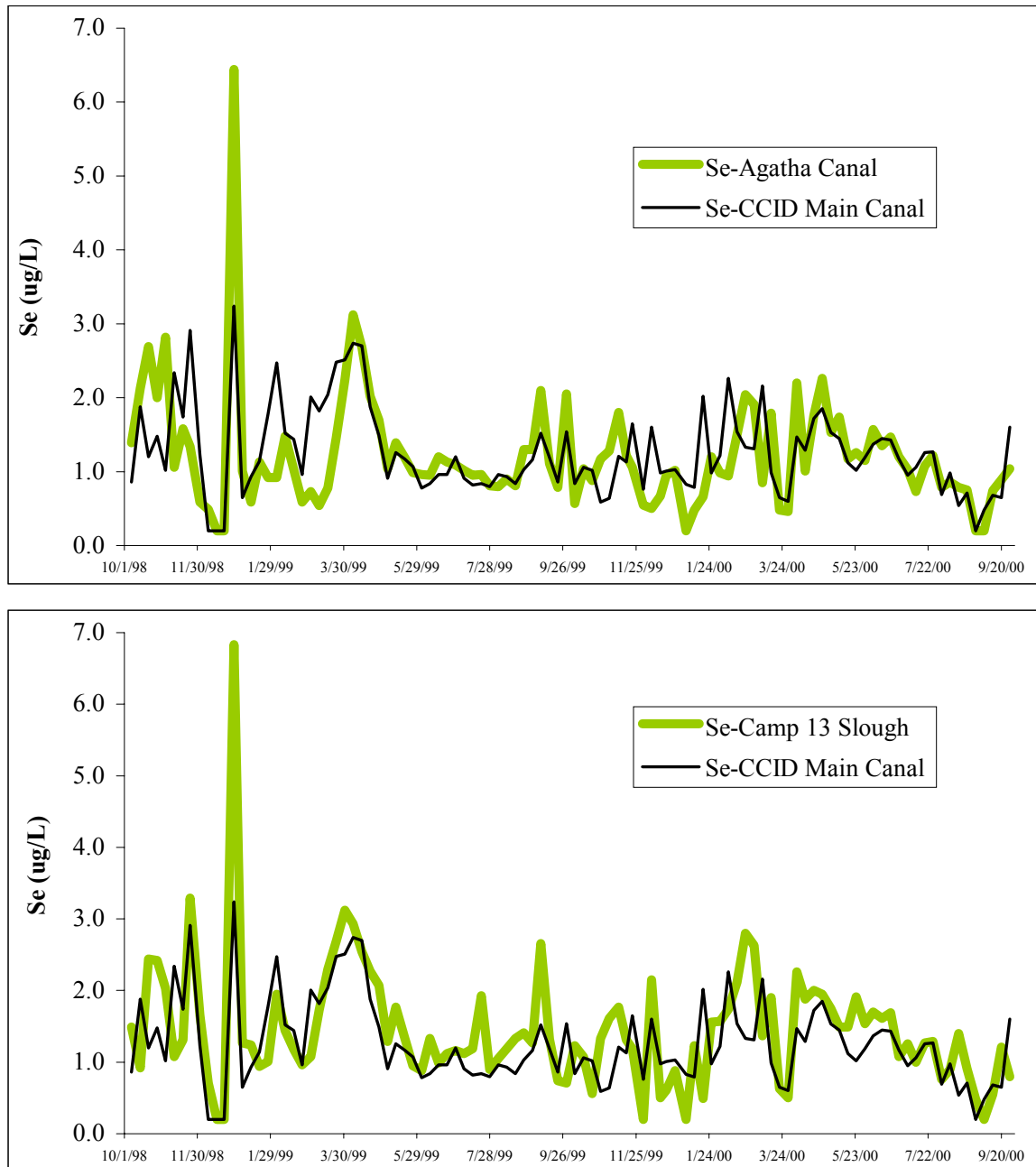


Figure 10A. Electrical Conductivity, Boron and Selenium Concentrations in the Santa Fe Canal and the San Luis Canal (Weekly data): Water Year 1999

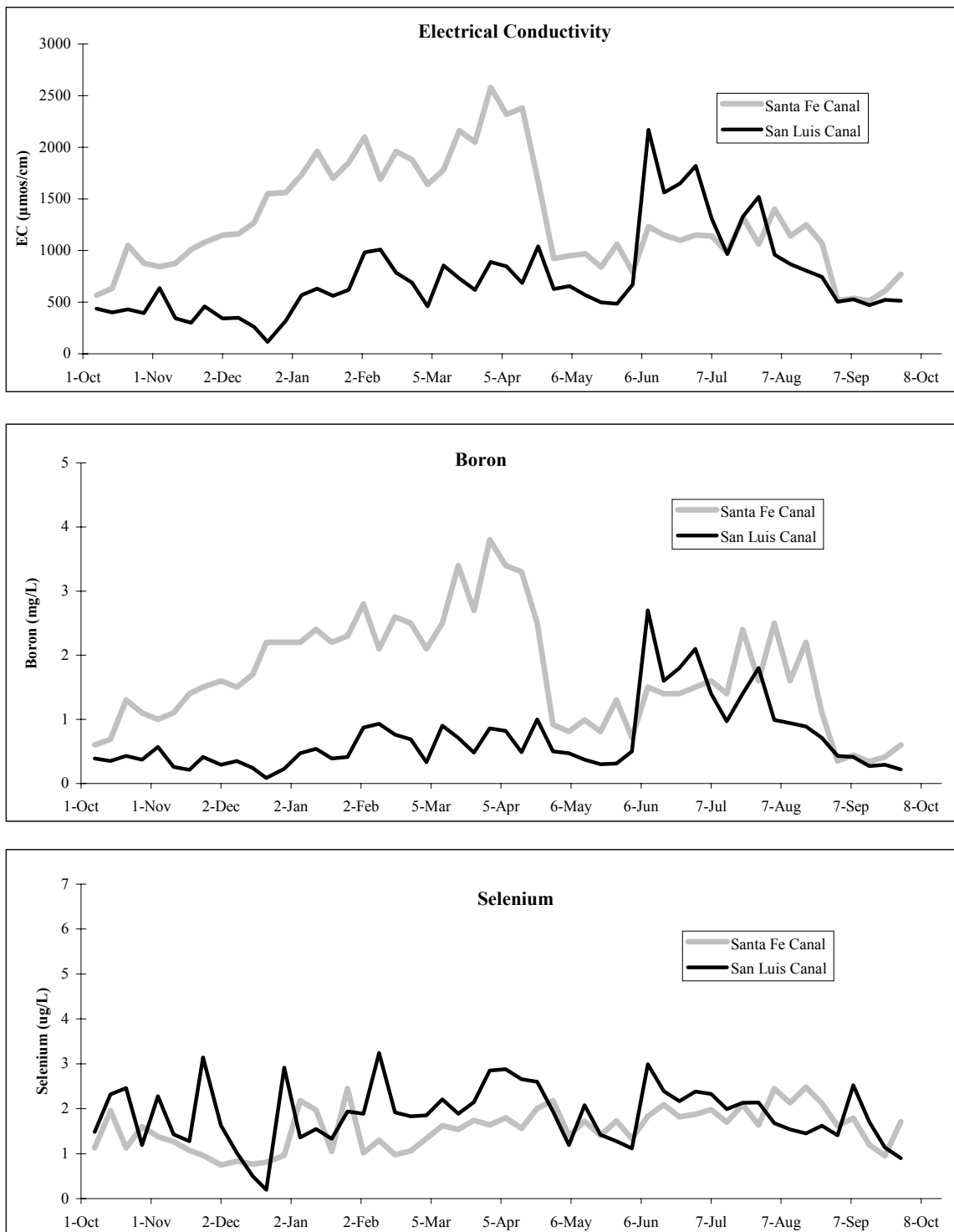
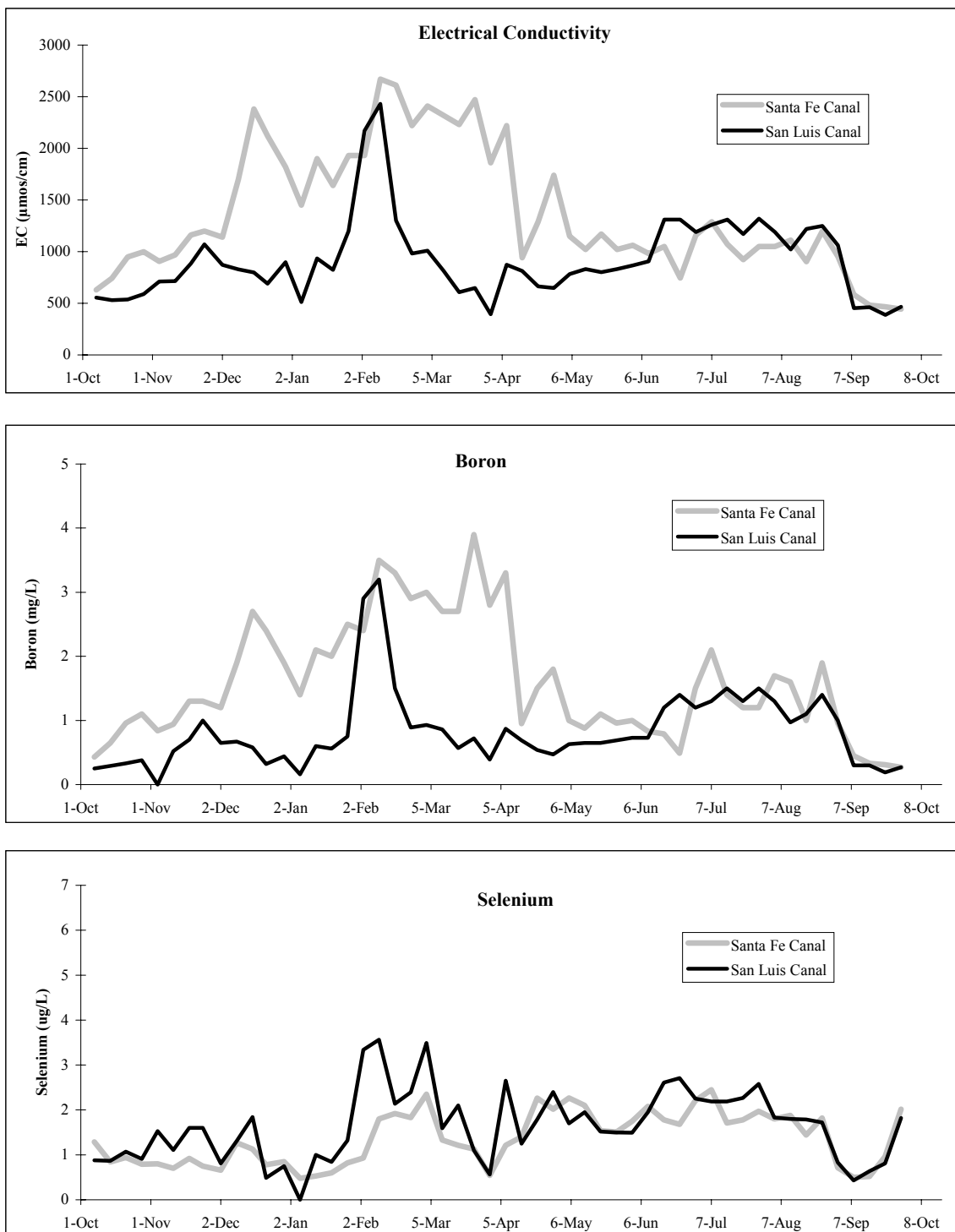
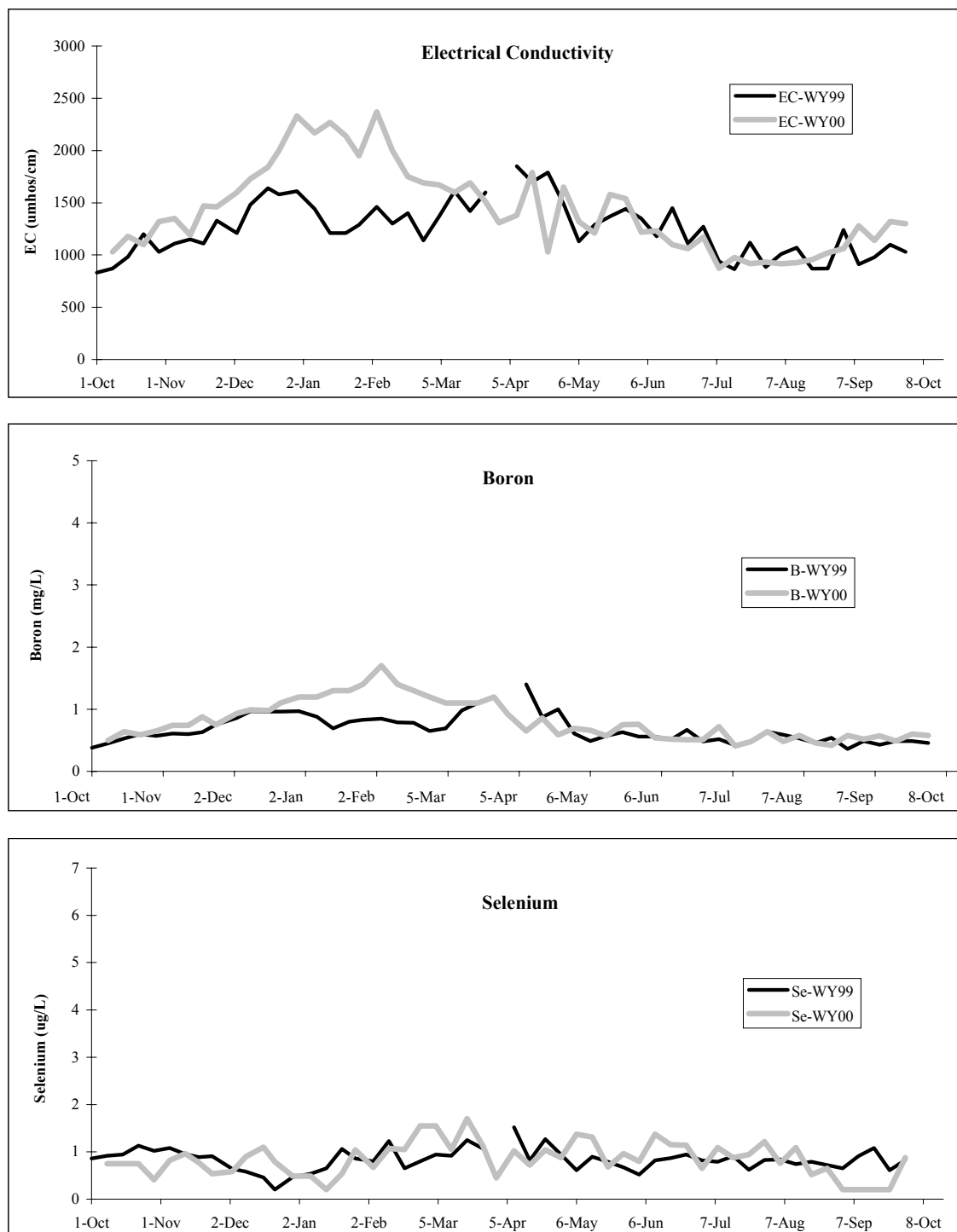


Figure 10B. Electrical Conductivity, Boron and Selenium Concentrations in the Santa Fe Canal and the San Luis Canal (Weekly data): Water Year 2000



**Figure 11. Electrical Conductivity, Boron and Selenium Concentrations in Salt Slough (Weekly data):
Water Years 1999 and 2000**



**Table 8. Trace Element Concentrations at Four Sites in the Grassland Watershed:
Water Years 1999 and 2000**

Site*	Date	Total Constituent (ug/L)					Hardness
		Cr	Cu	Ni	Pb	Zn	(mg/L)
WY 99							
MS-U	10/29/98	4	2	8	<5	5	190
SLD		5	3	5	<5	<2	1100
MS-D		5	3	7	<5	6	260
SS		3	3	5	<5	11	220
MS-U	1/28/99	5	5	9	<5	NA	296
SLD		11	4	<5	<5	NA	1050
MS-D		5	4	8	<5	NA	440
SS		2	5	<5	<5	NA	280
MS-U	4/29/99	72	49	100	14	120	240
SLD		9	3	<5	<5	<2	1200
MS-D		20	13	28	<5	33	520
SS		5	6	8	<5	19	290
MS-U	7/29/99	10	8	15	<5	18	380
SLD		4	4	<5	<5	2	950
MS-D		5	4	7	<5	<2	880
SS		8	9	12	<5	26	200
WY 00							
MS-U	10/28/99	3	3	7	<5	5	200
SLD		5	4	7	<5	5	1100
MS-D		3	2	6	<5	3	340
SS		4	5	7	<5	13	270
MS-U	1/27/00	3	3	8	<5	7	260
SLD		NA	NA	NA	NA	NA	1100
MS-D		4	3	7	<5	5	390
SS		4	5	7	<5	14	380
MS-U	4/27/00	3.7	3.8	6.8	<5	2.4	370
SLD		8.5	3.8	<5	<5	<2	1400
MS-D		7.2	3.7	5.7	<5	<2	1000
SS		2.7	4.2	5.2	<5	9.4	340
MS-U	7/27/00	1.2	2.4	<5	<5	NA	290
SLD		3.4	2.6	<5	<5	NA	870
MS-D		4.9	3.4	5.9	<5	NA	770
SS		5.1	6.4	8.3	<5	NA	210
MS-U	8/31/00	2.3	2.7	7.2	<5	3.4	260
SLD		5.1	3.2	6.8	<5	2.7	910
MS-D		3.9	2.8	6.1	<5	<2	870
SS		3.9	4.7	6.9	<5	12	120
MS-U	9/28/00	3.7	2.8	7.9	<5	4.9	260
SLD		3.2	3.7	5.9	<5	<2	970
MS-D		4.2	3.3	7.4	<5	5.5	490
SS		3.5	3.4	5.2	<5	8.0	180

* MS-U = Mud Slough (north) upstream of the San Luis Drain discharge; SLD = San Luis Drain @ Terminus
MS-D = Mud Slough (north) downstream of the San Luis Drain discharge; SS = Salt Slough @ Lander Avenue
NA = No data available

Other Elements of Concern

During Water Year 1999, limited additional water quality analyses were conducted quarterly for total copper, chromium, lead, nickel and zinc at four sites in the Grassland Watershed: Mud Slough (north) upstream of the San Luis Drain discharge, Mud Slough (north) downstream of the San Luis Drain discharge, the San Luis Drain at Terminus and Salt Slough at Lander Avenue. During Water Year 2000, in addition to the regular quarterly sampling for these trace elements, weekly sampling was conducted from 30 March to 29 June, 2000. Total molybdenum analyses were conducted on a monthly basis. **Table 8** lists total trace element concentrations for all samples for which hardness data is available. Only results that satisfied the quality control criteria listed in **Table 3**, have been included in **Table 8**. Molybdenum results appear in **Table 12**.

Relatively high concentrations of chromium, copper, nickel, lead and zinc were found at Mud Slough (north) upstream of the San Luis Drain discharge on 29 April 1999. Although the original data was confirmed by reanalyses, the elevated concentrations were not repeated during additional sampling events. When adjusted for hardness, none of the reported trace element concentrations exceeded existing water quality goals, except the single copper concentration reported in Mud Slough (north) upstream of the San Luis Drain discharge on 29 April 1999. The reported copper concentration of 49 ug/L exceeded the USEPA National Ambient Water Quality Criteria to Protect Freshwater Aquatic Life, which designates a maximum concentration (one hour average) of 39 ug/L when adjusted to a hardness level of 240 mg/L (Marshack, 1998). The cause of the relatively high concentrations of constituents at this site in April of 1999 is unknown.

Although there is no hardness data available to allow the weekly trace element data to be compared to the criteria, the weekly concentrations are similar to the quarterly and monthly values presented in **Table 8**. All trace element data meeting quality control criteria listed in **Table 3**, is presented in Appendix A.

DISCUSSION

Comparison of Water Years 1997-2000 to Pre-Project Conditions

When the Grassland Bypass became operational at the end of September 1996, it effectively consolidated agricultural subsurface drainage from the DPA into a single channel for discharge into the final nine miles of Mud Slough (north). This consolidation removed most subsurface drainage from approximately 90 miles of internal wetland water supply channels and from Salt Slough.

Table 5 lists minimum, mean, and maximum electrical conductivity, boron and selenium concentrations for above normal rainfall Water Years 1999 and 2000 and for wet Water Years 1997 and 1998 as well as a summary for all the wet water years that occurred between Water Years 1986 and 1996 (pre-Project). In general, concentrations reported during the post-Project water years (Water Years 1997 to 2000), are similar to each other.

The most notable differences in water quality occur between pre- and post-Project water years. Both EC and boron concentrations declined in Salt Slough and increased in Mud Slough (north)

after the Bypass began operation. The most dramatic change occurred with selenium concentrations. Removing agricultural subsurface drainage from Salt Slough reduced the mean selenium concentration from 15.8 ug/L during pre-Project wet years to below 2.0 ug/L during post-Project Water Years 1997-2000. A corresponding increase occurred in Mud Slough (north), downstream of the discharge from the San Luis Drain.

Water quality in the wetland water supply channels was more variable. After the Bypass began operation, selenium concentrations in Camp 13 Slough and the Agatha Canal decreased dramatically, with the exception of high selenium concentrations corresponding to diversions of stormwater flood flows. These diversions occurred during Water Years 1997 and 1998 and rerouted some subsurface drainage from the DPA, through these channels (Chilcott, 2000b). Absent flood flows, the diversions did not occur and concentrations remained relatively low during Water Years 1999 and 2000.

Although flood related selenium concentrations were not evident in Water Years 1999 and 2000, concentrations above 2 ug/L have continued to occur sporadically. Possible causes of the elevated selenium concentrations include elevated selenium levels in supply water, inflows from other sources such as the Rice Drain and Almond Drive Drain, and other internal sources such as groundwater seepage and surface return flows. These potential sources underwent a preliminary review in Chilcott (2000b) and an expanded evaluation in Eppinger, et. al., (2002).

Selenium concentrations in the San Luis Canal and Santa Fe Canal have remained variable, with generally lower overall concentrations occurring post-Project years at the Henry Miller Road sites. During pre-Project conditions, subsurface agricultural drainage from the DPA was usually diverted out of these canals and into Salt Slough through the Porter-Blake Bypass, upstream of the sampling locations. Only when subsurface agricultural drainage was diverted to Mud Slough (north) or continued downstream in the San Luis Canal to the City Ditch diversion to Salt Slough, would the impacts of the drainage be measured in these canals at Henry Miller Road. By Water Year 1997, the majority of subsurface drainage had been consolidated into the Grassland Bypass and lower portion of the San Luis Drain, and no longer reach the two canals except during flood flows. The sampling site locations were changed in Water Year 1999 to points above the splits, a point of potential commingling. The new sites are upstream of the former sampling locations and may help isolate sources of selenium into the system.

Comparison to Applicable Water Quality Objectives

In October 1988, the Regional Board adopted water quality objectives for boron, molybdenum and selenium for Mud Slough (north), Salt Slough and water used to maintain wetland habitat. In May 1996, the Regional Board adopted revised selenium water quality objectives for the two sloughs and for wetland water supply channels, as well as a compliance time schedule for Mud Slough (north). Water quality objectives that applied during both water years are listed in **Table 9**. The selenium compliance time schedule that applies to Mud Slough (north), does not require compliance with the selenium objective until 1 October 2010. No water quality objectives have been adopted for the San Luis Drain.

Table 9. Boron, Selenium and Molybdenum Water Quality Objectives for Water Bodies Within the Grassland Watershed. Water Years 1999 and 2000.

Water Body	Boron (mg/L)		Selenium (ug/L)		Molybdenum (ug/L)	
	Continuous	Maximum	Continuous	Maximum	Continuous	Maximum
Mud Slough (north)	2.0 (monthly mean)†	5.8	5 (4-day average)*	20	19 (monthly mean)	50
Salt Slough	2.0 (monthly mean)†	5.8	2 (monthly mean)	20	19 (monthly mean)	50
Wetland Water Supply Channels	—	—	2 (monthly mean)	20	—	—

† = The water quality objective only applies from 15 March through 15 September

* = Compliance time schedule adopted and in effect until October 2010

Table 10 lists mean monthly boron concentrations and identifies boron concentrations above water quality objectives in Water Years 1999 and 2000. **Table 11** lists mean monthly selenium concentrations and the months when selenium concentrations were above 2 ug/L in the wetland water supply channels and above 5 ug/L in the remaining water bodies, respectively, for Water Years 1999 and 2000. Calculations of monthly means were based on all data collected during each calendar month.

Boron

The boron water quality objective applies to Mud Slough (north) and Salt Slough. The objective (2.0 mg/L) applies as a monthly mean for a set time period: 15 March through 15 September. A maximum objective of 5.8 mg/L boron applies year round.

During Water Years 1999 and 2000, mean monthly boron concentrations were only reported above 2.0 mg/L in Mud Slough (north) downstream of the San Luis Drain discharge. Boron concentrations remained below 2.0 mg/L in Mud Slough (north) upstream of the San Luis Drain discharge and in Salt Slough during both water years. Maximum boron concentrations in Mud Slough (north) downstream of the San Luis Drain discharge were above 5.8 mg/L during each week sampled between 17 June and 19 August 1999. Similar trends were seen in Water Year 2000.

Selenium

Revised selenium water quality objectives, were adopted in May 1996 and went into effect on 10 January 1997. These objectives included a 2 ug/L monthly mean selenium objective for all wetland water supply channels and Salt Slough. Both a 5 ug/L 4-day average, and a 20 ug/L instantaneous objective were adopted for Mud Slough (north) along with a compliance time schedule which requires that the objectives be met by 1 October 2010.

During Water Year 1999, monthly selenium concentrations were above 2 ug/L on a number of occasions in the supply channels (Camp 13, Agatha, San Luis Canal and Santa Fe Canal), with the highest monthly mean (2.5 ug/L) at both Camp 13 Slough and the San Luis Canal. The majority

of elevated concentrations occurred between February and April 1999, although monthly mean selenium concentrations remained above 2 ug/L in the San Luis Canal until July. Water Year 2000 showed fewer elevated concentrations overall. Most elevated concentrations occurred in the San Luis Canal which had monthly mean selenium concentrations in excess of 2 ug/L in the months of February (2.9 ug/L), June (2.4 ug/L) and July (2.3 ug/L). The maximum concentrations reported in the supply canals during Water Years 1999 and 2000 were 6.8 ug/L recorded in Camp 13 and 3.5 ug/L recorded in the San Luis Canal, respectively.

A number of factors may have led to the selenium concentrations in excess of 2 ug/L and each must be further evaluated to determine a means of reducing overall concentrations. An initial study of additional sources of selenium into these water bodies has been conducted (Chilcott 2000b) with follow up review (Eppinger *et al.*, 2002). Some potential sources identified include additional areas of subsurface agricultural drainage outside of the Drainage Project Area, seepage from drainage channels, elevated concentrations in supply water, and natural background concentrations in local groundwater.

Although subject to the adopted compliance time schedule, selenium concentrations in Mud Slough (north) were evaluated against the 5 ug/L, 4-day average selenium water quality objective which will apply beginning 1 October 2010. Monthly mean selenium concentrations Mud Slough (north) downstream of the San Luis Drain Discharge continuously remained above 5 ug/L during Water Years 1999 and 2000, while monthly mean selenium concentrations remained below 2 ug/L upstream of the discharge.

Molybdenum

During Water Years 1999 and 2000, molybdenum monitoring was focused on sites which would likely be influenced by the Grassland Bypass Project and included monthly analyses in Mud Slough (north) upstream and downstream of the San Luis Drain discharge, the San Luis Drain itself, and quarterly analyses at Salt Slough. Available data is presented in **Table 12**.

During Water Year 1999, molybdenum concentrations in Mud Slough (north) upstream of the San Luis Drain discharge and in Salt Slough resembled historic concentrations and remained below the 19 ug/L objective. While no objective applied to the drain itself, molybdenum concentrations in the discharge were elevated, ranging from 20 ug/L to 36 ug/L. Downstream of the drain discharge, molybdenum concentrations were above 19 ug/L during July and August, when concentrations reached 23 ug/L and 21 ug/L, respectively. Water Year 2000 followed similar trends, with molybdenum concentrations in Mud Slough (north) downstream of the San Luis Drain above 19 ug/L in April, June and August.

Table 10. Boron Mean Monthly Concentrations and Water Quality Objective Exceedances in the Grassland Watershed: Water Years 1999 and 2000.

Station ID	Description	Mean Monthly Concentration (mg/L) - WY 99												Mean Monthly Concentration (mg/L) - WY 00												Monthly WQO
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
MER536	Mud Slu (N) u/s of SLD Discharge	0.6	1.0	1.2	1.3	1.5	1.9	1.7	1.1	1.4	1.7	1.7	0.60	0.6	0.9	1.2	1.3	1.4	1.8	1.9	1.5	1.6	1.6	1.5	0.51	2.0*
MER542	Mud Slu (N) d/s of SLD Discharge	2.1	2.1	2.4	2.5	2.8	3.7	3.8	4.2	5.2	6.5	6.5	4.1	1.7	1.9	2.3	2.2	2.6	3.7	5.0	4.9	5.9	6.0	5.8	3.9	2.0*
MER531	Salt Slough at Lander Avenue	0.5	0.6	0.9	0.8	0.8	1.0	1.0	0.56	0.56	0.53	0.47	0.47	0.6	0.8	1.0	1.3	1.4	1.1	0.70	0.69	0.56	0.50	0.51	0.56	2.0*

bold = water quality objective exceedance

WQO = water quality objective in mg/L

*objective applies 15 March through 15 September

Table 11. Selenium Mean Monthly Concentrations and Water Quality Objective Exceedances in the Grassland Watershed: Water Years 1999 and 2000.

Station ID	Description	Mean Monthly Concentration (ug/L) - WY 99												Mean Monthly Concentration (ug/L) - WY 00												Monthly WQO
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
MER510	CCID Main Supply @ Russell	1.4	2.0	1.0	1.1	1.6	2.2	2.2	1.1	0.9	0.8	0.9	1.2	0.9	1.2	1.1	1.2	1.6	1.1	1.6	1.3	1.4	1.1	0.6	0.9	n/a
MER505	Camp 13 Ditch	1.8	1.9	1.9	1.1	1.4	2.2	2.5	1.3	1.1	1.3	1.2	1.3	1.0	1.5	0.7	0.9	2.1	1.4	2.0	1.7	1.5	1.2	0.9	0.7	2
MER506	Agatha Canal	2.1	1.7	1.6	0.9	1.0	1.2	2.4	1.2	1.1	0.9	1.0	1.5	0.9	1.3	0.5	0.6	1.4	1.1	1.8	1.4	1.4	1.0	0.7	0.6	2
MER563	San Luis Canal at Splits	1.9	2.0	1.2	1.5	2.2	2.2	2.5	1.5	2.2	2.1	1.6	1.5	0.9	1.5	0.7	0.8	2.9	1.8	2.0	1.6	2.4	2.3	1.6	0.9	2
MER545	Santa Fe Canal at Weir	1.5	1.2	0.6	1.9	1.1	1.6	1.9	1.6	1.8	1.9	2.3	1.5	1.0	0.8	0.9	0.6	1.6	1.3	1.7	1.8	1.9	2.0	1.5	1.0	2
MER551	Mud Slu (N) u/s of SLD Discharge	0.6	0.6	<0.4	0.5	0.7	0.8	1.6	1.0	1.2	1.9	1.6	0.5	0.3	0.4	0.2	0.3	0.8	0.7	1.1	1.4	1.4	1.1	1.1	0.3	5
MER542	Mud Slu (N) d/s of SLD Discharge	9.1	8.9	9.7	9.8	17.7	24.8	32.9	30.4	33.4	39.4	38.9	23.6	5.2	5.7	10.6	9.2	13.1	26.8	37.8	32.6	30.3	34.1	32.6	23.2	5
MER531	Salt Slough at Lander Avenue	1.0	1.0	0.5	0.8	0.9	1.0	1.1	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.6	1.1	1.2	0.9	1.1	1.0	1.0	0.6	0.4	2

bold = water quality objective exceedance

WQO = water quality objective in ug/L

n/a = no water quality objective (WQO) for this site

= Note that the 5 ug/L 4-day average Se WQO for Mud Slough (north) is subject to a compliance time schedule and must be met no later than 1 October 2010

Table 12. Molybdenum Mean Monthly Concentrations and Water Quality Objective Exceedances in the Grassland Watershed: Water Years 1999 and 2000.

Station ID	Description	Monthly Grab Sample Concentration (ug/L) - WY 99												Monthly Grab Sample Concentration (ug/L) - WY 00												Monthly WQO
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
MER536	Mud Slu (N) u/s of SLD Discharge	4	5	6	8	8	8	5	10	12	14	8	7	3.3	5.5	6.3	6.4	5.8	11	13	14	18	8.3	8.1	8.2	19
MER535	San Luis Drain at the Terminus	36	35	35	28	28	23	31	23	23	26	20	33	36	39	27	26	26	32	29	24	27	23	22	32	n/a
MER542	Mud Slu (N) d/s of SLD Discharge	8	10	13	10	15	12	13	16	18	23	21	14	7.4	10	9.8	9	8.7	19	24	19	23	17	23	17	19
MER531	Salt Slough at Lander Avenue	NA	NA	NA	7	NA	NA	10	NA	NA	8	NA	NA	7.2	NA	NA	9.9	NA	NA	9.6	9.2	9.6	4.5	7.5	9.5	19

bold = water quality objective exceedance

NA = no data available

n/a = no water quality objective (WQO) for this site

LOADS OF SALT, BORON, AND SELENIUM

Data Availability: Water Years 1999 and 2000

On 24 July, 1998 the Central Valley Regional Water Quality Control Board adopted Waste Discharge Requirements (Order No. 98-171) to regulate the discharge of subsurface agricultural drainage through a portion of the San Luis Drain to Mud Slough (north) and ultimately the San Joaquin River as a component of the Grassland Bypass Project (GBP). Compliance with the Waste Discharge Requirements is based in part on monthly and annual selenium load allocations. Water Years 1999 and 2000 were the third and fourth years of operation of the GBP. Prior to Water Year 1997, discharge and load from the Drainage Project Area (DPA) was estimated by summing the discharge and load in several channels within the Grassland Watershed. Starting in Water Year 1997, all drainage from the DPA was diverted into the Grassland Bypass and the San Luis Drain as part of the GBP. Since Water Year 1997, discharge and load for the DPA have been calculated using information collected at the terminus of the San Luis Drain. Discharge and load for the Grassland Watershed are estimated by summing discharge and load from Mud Slough (north) and Salt Slough.

Salt, boron, and selenium loads for the DPA and the Grassland Watershed were estimated based upon the flow weighted monthly average of available water quality data for Water Years 1999 and 2000. Daily discharge and daily electrical conductivity data for the DPA and the two sites representing the Grassland Watershed were obtained from the USGS (Henry Miyashita, personal communication). Salt loads for the DPA and the Grassland Watershed sites are based upon daily USGS electrical conductivity measurements. Boron and selenium loads for the DPA are based upon composite samples collected by automated SigmaTM sampling devices and grab samples when composite samples are not available. Boron and selenium loads for the Grassland Watershed sites are based upon weekly grab samples. The methodology used to calculate loads can be found in Grober et al., 1998. Raw data used to calculate loads have been tabulated and are available in hard copy from the Regional Board's Sacramento office. This information can also be found at the Regional Board web site. Follow the links to view or download files from:

<http://www.swrcb.ca.gov/rwqcb5/>

The tabulated flow and water quality data used to compute loads for Water Years 1986 through 1995 are presented at this website. Each year of data is comprised of four data tables; the first table contains mean daily flow data; the second, third and fourth contain electrical conductivity (EC), boron and selenium data, respectively. Additionally, EC, boron and selenium data are presented for five SigmaTM automated sampler sites for Water Years 1995 through 1999. Matrices are sparsely filled for some water quality data.

A full review of the information required by the WDR and additional information related to the GBP can be found in the Grassland Bypass Project Annual Report (SFEI, 1999 and 2000).

Monthly Loads: Water Years 1999 and 2000

Monthly discharge and monthly flow-weighted average concentrations and loads for the DPA were calculated for Water Years 1999 and 2000, based on information from the San Luis Drain (**Tables 13A and B**). Monthly discharge and monthly flow-weighted average concentrations and loads for the Grassland Watershed are based on the sum of discharge and loads for Mud Slough (north) and Salt Slough as presented in **Tables 14A and B** for Water Years 1999 and 2000, respectively. Monthly discharge and monthly flow-weighted average concentrations and loads for the individual slough for each water year are presented in **Tables 15A, B and 16A, B**.

Monthly discharge for the DPA and the Grassland Watershed for Water Years 1999 and 2000 are depicted in **Figure 12A** and **Figure 12B**. Discharge from the DPA was similar for both years, and ranged from a minimum of 1 thousand acre feet (taf) during the non-irrigation season to a maximum of 4 taf during the irrigation season. Discharge from the Grassland Watershed was also similar for both years, and ranged from a minimum of 13 taf in September 1999 and 10 taf in September 2000, to a maximum of 35 taf in March 1999 and 36 taf in March 2000. For Water Year 1999, the DPA comprised 32 percent of the discharge in Mud Slough (north) and 13 percent of the discharge from the Grassland Watershed. For Water Year 2000, the DPA comprised 33 percent of the discharge in Mud Slough (north) and 13 percent of the discharge from the Grassland Watershed.

Monthly salt loads for Water Years 1999 and 2000 are depicted in **Figures 13A and 13B**, respectively. Monthly salt loads for the DPA and the Grassland Watershed followed their respective discharge trend with the highest loads occurring in March. For Water Year 1999, the DPA comprised 64 percent of the salt load in Mud Slough (north) and 37 percent of the total salt load discharged from the Grassland Watershed. For Water Year 2000, the DPA comprised 67 percent of the salt load in Mud Slough (north) and 36 percent of the total salt load discharged from the Grassland Watershed.

Monthly boron loads for Water Years 1999 and 2000 are depicted in **Figures 14A and 14B**, respectively. Similar to monthly salt loads, monthly boron loads for the DPA and the Grassland Watershed followed their respective discharge trend. For Water Year 1999, the DPA comprised 70 percent of the boron load in Mud Slough (north) and 53 percent of the total boron load discharged from the Grassland Watershed. For Water Year 2000, the DPA comprised 77 percent of the boron load in Mud Slough (north) and 55 percent of the total boron load discharged from the Grassland Watershed.

Monthly selenium loads for Water Years 1999 and 2000 are depicted in **Figures 15A and 15B**. Monthly selenium loads for both the DPA and the Grassland Watershed closely follow the trend of discharge from the DPA. For Water Year 1999, the DPA comprised 92 percent of the total selenium load in Mud Slough (north) and 87 percent of the total selenium load discharged from the Grassland Watershed. For Water Year 2000, the DPA comprised 106 percent of the total selenium load in Mud Slough (north) and 98 percent of the total selenium load discharged from the Grassland Watershed. Monthly selenium loads for the DPA remained below the monthly

selenium load allocations specified in the Waste Discharge Requirements during all months of Water Years 1999 and 2000.

Calculations for Water Year 1999 indicate that the DPA discharged a greater selenium load than the Grassland Watershed during the month of June, and a greater selenium load than Mud Slough (north) during the months of December, January, and June. Calculations for Water Year 2000 indicate that the DPA discharged a greater selenium load than the Grassland Watershed during the months of October, November, December, and September, and a greater selenium load than Mud Slough (north) during all months, with the exception of January. This discrepancy (up to 28%) may be attributed to sampling error including: flow measurements; low flow or backflow conditions; groundwater interaction; other unknowns; or any combination of the aforementioned processes. For a full discussion of possible calculation errors or system losses see Grober et al, 1998.

Annual Loads: Water Years 1986 to 2000

Figures 16 - 19 show the annual discharge, and salt, boron, and selenium loads for the DPA, and the Grassland Watershed. Pre-project water years were either wet (Water Years 1986, 1993, 1995, and 1996) or critically dry. Discharge and corresponding loads during the pre-project period reflected the hydrology with the highest discharge and loads occurring during the wettest years and the lowest discharge and loads occurring after multiple critically dry years.

Post-project discharge and load trends somewhat follow the hydrology with the highest values during wet water years 1997 and 1998; however the magnitude of the discharge and load is less than would be expected given the prior history, particularly for selenium. For selenium, the loads recorded during the two wettest years for this record are comparable to the loads recorded during the mid years of the extended drought (Water Years 1989 and 1990) while the selenium loads during above normal Water Years 1999 and 2000 reflect the lowest pre-project selenium loads recorded after seven critically dry years.

Annual discharges for the DPA and the Grassland Watershed sites for Water Years 1986 through 2000 are shown in Figure 16. Discharge for the DPA and Grassland Watershed decreased 3% and 7%, respectively, from Water Year 1999 to Water Year 2000. When compared to Water Year 1996, the last pre-project water year, discharge from the DPA decreased 36% and 37% during Water Year 1999 and Water Year 2000, respectively, while discharge from the Grassland Watershed decreased 6% and 13%, respectively.

Annual salt loads for the DPA and the Grassland Watershed sites for Water Years 1986 through 2000 are shown in Figure 17. Salt loads for the DPA and Grassland Watershed both decreased 7% from Water Year 1999 to Water Year 2000. When compared to Water Year 1996, the last pre-project water year, salt load from the DPA decreased 26% and 31% during Water Year 1999 and Water Year 2000, respectively, while salt load from the Grassland Watershed decreased 16% and 22%, respectively.

Note that estimated TDS loads discharged from the DPA during Water Years 1997 and 1998 have been revised from those reported in the Water Year 1997 and 1998 reports (Chilcott, et al., 1998,

Chilcott, et al., 2000a). An EC/TDS relationship of 0.62 was previously used to calculate the estimated DPA TDS loads for Water Years 1997 and 1998. Based on data gathered from the GBP discharge, it was determined that 0.74 better represents the EC/TDS relationship, and this number was used to estimate the DPA TDS load for Water Years 1999 and 2000. This number was also used to adjust the estimated DPA TDS loads for Water Years 1997 and 1998.

Annual boron loads for the DPA and the Grassland Watershed sites for Water Years 1986 through 2000 are shown in Figure 18. Boron loads for the DPA and Grassland Watershed decreased 6% and 9%, respectively, from Water Year 1999 to Water Year 2000. When compared to Water Year 1996, the last pre-project water year, boron load from the DPA decreased 11% and 16% during Water Year 1999 and Water Year 2000, respectively, while boron load from the Grassland Watershed decreased 7% and 15%, respectively.

Annual selenium loads for the DPA and the Grassland Watershed sites for Water Years 1986 through 2000 are shown in Figure 19. Selenium loads for the DPA and Grassland Watershed decreased 10% and 20%, respectively, from Water Year 1999 to Water Year 2000. When compared to Water Year 1996, the last pre-project water year, selenium load from the DPA decreased 49% and 54% during Water Year 1999 and Water Year 2000, respectively, while selenium load from the Grassland Watershed decreased 38% and 50%, respectively. Annual selenium loads for the DPA remained below the maximum annual selenium load allocations specified in the Waste Discharge Requirements during Water Years 1999 and 2000.

Trends evident for discharge and the various loads from the DPA and Grassland Watershed can be partially explained based on what is known about the changing hydrology and management of the DPA. New management practices resulting from the GBP and use of the San Luis Drain to route agricultural drainage from the DPA to Mud Slough (north) have affected the quality and quantity of water discharged from the DPA. The Grassland Area Farmers (GAF) have greatly restricted the quantity of tail water that is commingled with subsurface tile drainage. The GAF have also used selective recycling and blending of tile drainage with agricultural supply water and other water conservation and drainage reduction methods to reduce peak selenium loads. Subsurface drainage selected for recycling and blending because of its high selenium concentrations does not necessarily have similarly high salt or boron concentrations. Therefore, salt and boron loads may remain elevated while selenium loads decrease. Loads of salt, boron, and selenium will have to be monitored for several more years at the current hydrologic and management conditions to better understand the patterns of salt, boron, and selenium loading. Water conservation and tail water reduction have likely contributed to the overall reduction in drainage volume discharged from the DPA in recent years.

Table 13A. Drainage Project Area (Based on GBP Discharges): Water Year 1999

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-98	2	278	43	10	50.0	7.7	3,460
Nov-98	2	222	31	7	53.5	7.5	3,580
Dec-98	1	242	32	7	61.2	8.1	3,560
Jan-99	2	284	34	8	61.5	7.4	3,380
Feb-99	3	610	59	15	67.8	6.6	3,260
Mar-99	3	800	72	17	85.4	7.7	3,740
Apr-99	2	527	43	11	93.2	7.6	4,020
May-99	3	482	58	14	59.8	7.2	3,390
Jun-99	4	524	77	16	53.4	7.8	3,260
Jul-99	4	462	79	17	43.9	7.5	3,200
Aug-99	4	418	73	15	39.3	6.9	2,890
Sep-99	2	275	42	10	42.1	6.4	2,990
WY Total	32	5,120	643	147	58.3	7.3	3,350

Table 13B. Drainage Project Area (Based on GBP Discharges): Water Year 2000

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-99	2	176	36	8	35.1	7.2	3,320
Nov-99	2	193	32	7	41.4	6.9	3,150
Dec-99	1	237	26	6	62.2	6.8	3,240
Jan-00	2	285	31	8	61.1	6.6	3,220
Feb-00	3	541	61	15	62.3	7.0	3,420
Mar-00	3	761	71	17	84.0	7.8	3,770
Apr-00	3	549	55	13	75.8	7.6	3,610
May-00	3	427	57	12	55.1	7.4	3,140
Jun-00	4	439	73	15	44.5	7.4	3,130
Jul-00	4	425	69	15	42.8	6.9	2,930
Aug-00	3	321	61	12	34.0	6.5	2,600
Sep-00	2	242	33	7	49.6	6.8	2,810
WY Total	31	4,590	605	136	54.0	7.1	3,190

Table 14A. Total discharges for Mud and Salt Slough (Representing the Grassland Watershed): Water Year 1999

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-98	22	313	79	25	5.2	1.3	838
Nov-98	20	267	73	27	4.8	1.3	971
Dec-99	18	253	82	29	5.1	1.7	1,170
Jan-99	26	311	104	39	4.4	1.5	1,100
Feb-99	34	726	152	55	7.8	1.6	1,180
Mar-99	35	940	188	66	9.9	2.0	1,390
Apr-99	18	702	105	34	14.4	2.1	1,390
May-99	16	502	81	27	11.6	1.9	1,270
Jun-99	16	513	91	29	11.9	2.1	1,370
Jul-99	17	555	103	26	12.3	2.3	1,170
Aug-99	17	537	101	25	11.4	2.1	1,060
Sep-99	13	297	59	18	8.2	1.6	1,010
WY Total	253	5,910	1,210	402	8.6	1.8	1,170

Table 14B. Total discharges for Mud and Salt Slough (Representing the Grassland Watershed): Water Year 2000

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-99	21	171	67	26	5.1	1.7	1,030
Nov-99	19	172	68	27	5.8	1.8	1,140
Dec-99	14	225	64	26	10.5	2.3	1,460
Jan-00	19	315	96	35	9.4	2.2	1,310
Feb-00	31	568	157	53	12.3	2.4	1,330
Mar-00	36	831	179	62	22.5	3.3	1,830
Apr-00	21	563	96	35	36.6	4.8	2,390
May-00	17	447	86	27	28.3	4.5	1,930
Jun-00	16	438	87	25	29.6	5.1	2,210
Jul-00	17	424	86	25	33.9	6.0	2,290
Aug-00	15	339	72	20	32.4	5.8	2,110
Sep-00	10	211	44	13	24.3	4.0	1,660
WY Total	235	4,704	1,102	374	16.9	3.1	1,570

Table 15A. Mud Slough (North): Water Year 1999

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-98	12	285	64	16	9.0	2.0	1,030
Nov-98	10	239	55	16	8.9	2.0	1,190
Dec-99	9	241	59	17	9.6	2.4	1,350
Jan-99	11	275	70	21	9.6	2.4	1,440
Feb-99	14	676	110	30	18.0	2.9	1,610
Mar-99	13	877	130	34	24.4	3.6	1,910
Apr-99	7	668	76	17	33.9	3.9	1,770
May-99	6	483	66	16	29.6	4.0	2,000
Jun-99	6	491	76	19	32.4	5.0	2,510
Jul-99	5	529	86	17	39.5	6.4	2,490
Aug-99	5	511	85	16	39.2	6.5	2,410
Sep-99	5	277	48	11	22.6	3.9	1,720
WY Total	101	5,550	925	230	20.1	3.4	1,670

Table 15B. Mud Slough (North): Water Year 2000

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-99	11	153	51	16	5.1	1.7	1,030
Nov-99	10	151	48	15	5.8	1.8	1,140
Dec-99	7	211	46	15	10.5	2.3	1,460
Jan-00	12	301	70	21	9.4	2.2	1,310
Feb-00	16	520	100	28	12.3	2.4	1,330
Mar-00	12	755	110	31	22.5	3.3	1,830
Apr-00	5	522	68	17	36.6	4.8	2,390
May-00	5	410	65	14	28.3	4.5	1,930
Jun-00	5	409	71	15	29.6	5.1	2,210
Jul-00	4	387	68	13	33.9	6.0	2,290
Aug-00	4	319	57	10	32.4	5.8	2,110
Sep-00	3	205	34	7	24.3	4.0	1,660
WY Total	94	4,340	788	202	16.9	3.1	1,570

Table 16A. Salt Slough: Water Year 1999

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-98	11	28	15	9	1.0	0.5	629
Nov-98	11	28	18	11	1.0	0.6	764
Dec-99	9	12	23	12	0.5	0.9	988
Jan-99	15	36	34	18	0.8	0.8	867
Feb-99	20	50	42	25	0.9	0.8	892
Mar-99	22	63	58	32	1.1	1.0	1,070
Apr-99	11	34	29	16	1.1	1.0	1,120
May-99	10	19	15	11	0.7	0.6	829
Jun-99	10	22	15	10	0.8	0.5	746
Jul-99	12	26	17	10	0.8	0.5	613
Aug-99	13	26	16	9	0.8	0.5	551
Sep-99	9	20	11	8	0.8	0.5	648
WY Total	152	364	293	172	0.9	0.7	832

Table 16B. Salt Slough: Water Year 2000

		Constituent Load			Flow Weighted Concentrations		
Month	Flow (taf)	Se (lbs)	B (1000 lbs)	TDS (1000 tons)	Se (ppb)	B (ppm)	TDS (ppm)
Oct-99	10	18	16	10	0.7	0.6	716
Nov-99	9	21	20	12	0.9	0.8	915
Dec-99	6	14	18	11	0.9	1.0	1,260
Jan-00	7	14	26	14	0.8	1.3	1,390
Feb-00	16	48	57	25	1.2	1.3	1,170
Mar-00	23	76	69	31	1.3	1.1	989
Apr-00	16	41	28	18	1.1	0.7	844
May-00	12	37	21	13	1.3	0.7	829
Jun-00	11	29	16	10	1.1	0.6	693
Jul-00	13	37	18	12	1.1	0.5	648
Aug-00	11	20	15	10	0.7	0.5	642
Sep-00	6	6	10	6	0.4	0.6	630
WY Total	141	361	314	171	1.0	0.8	891

Figure 12A. Monthly Discharge from the DPA and Grassland Watershed: Water Year 1999

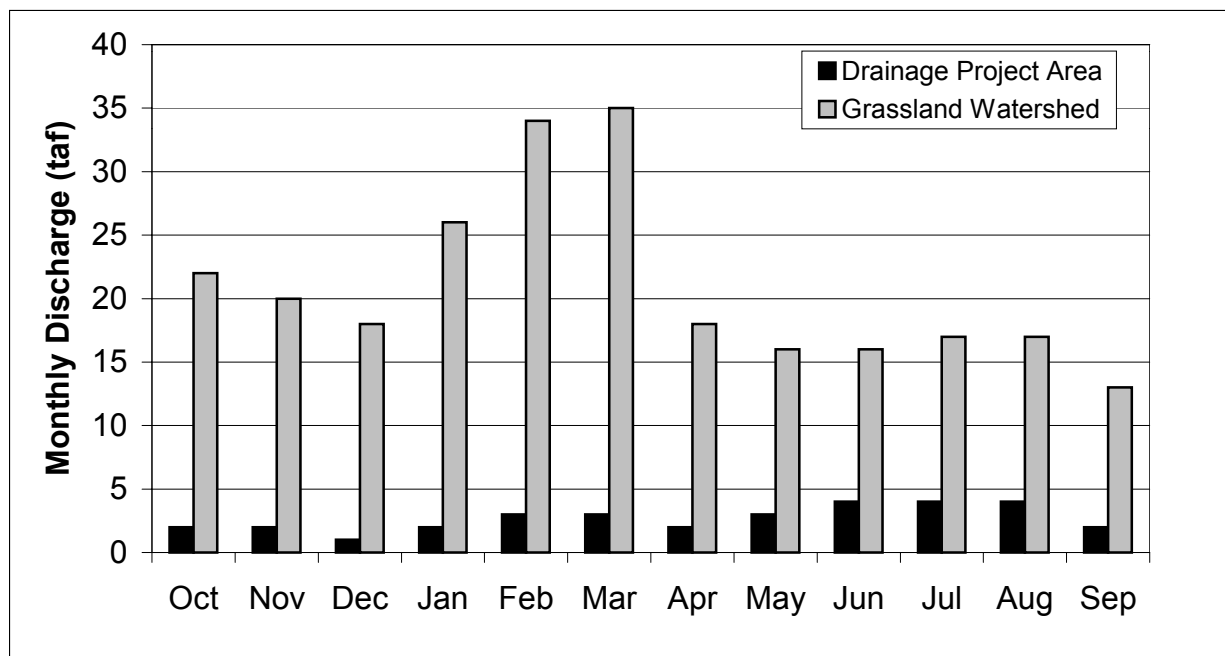


Figure 12B. Monthly Discharge from the DPA and Grassland Watershed: Water Year 2000

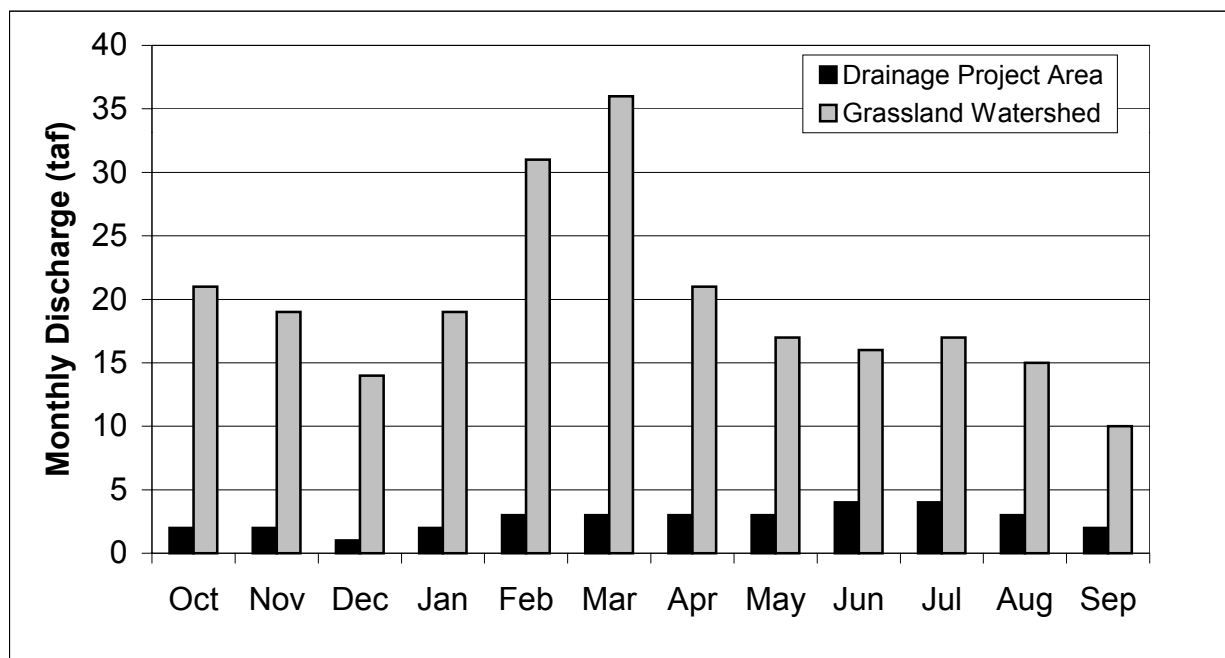


Figure 13A. Monthly Salt Loads from the DPA and Grassland Watershed: Water Year 1999

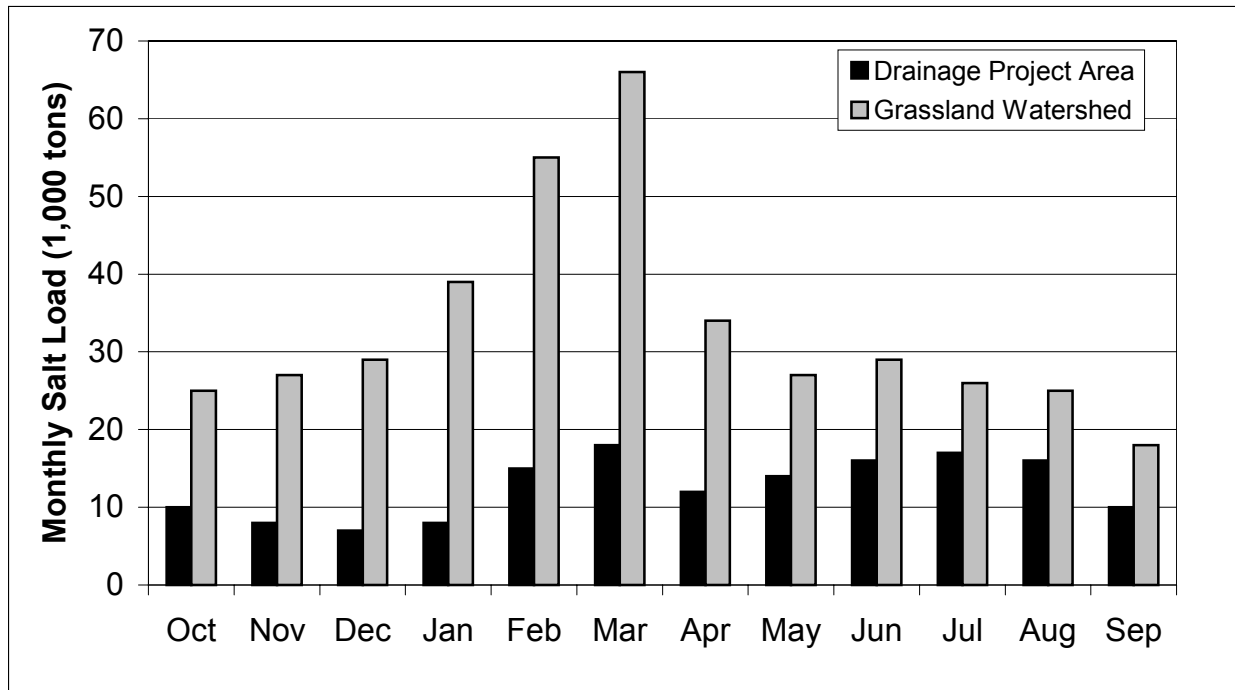
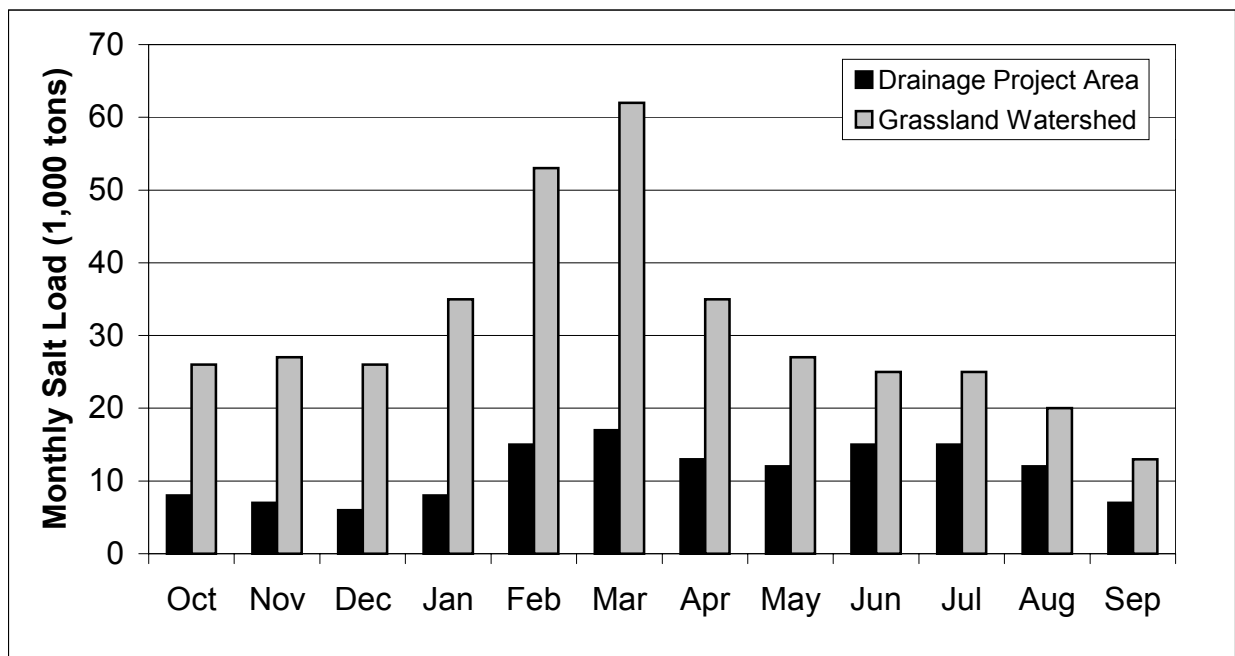
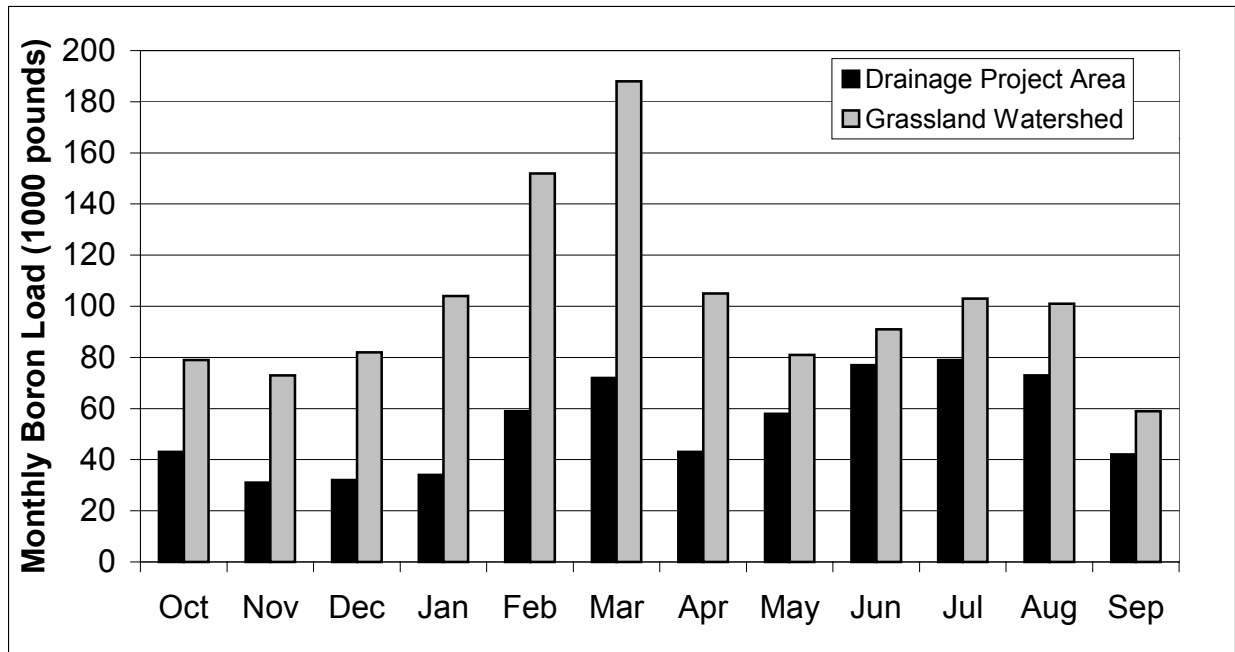


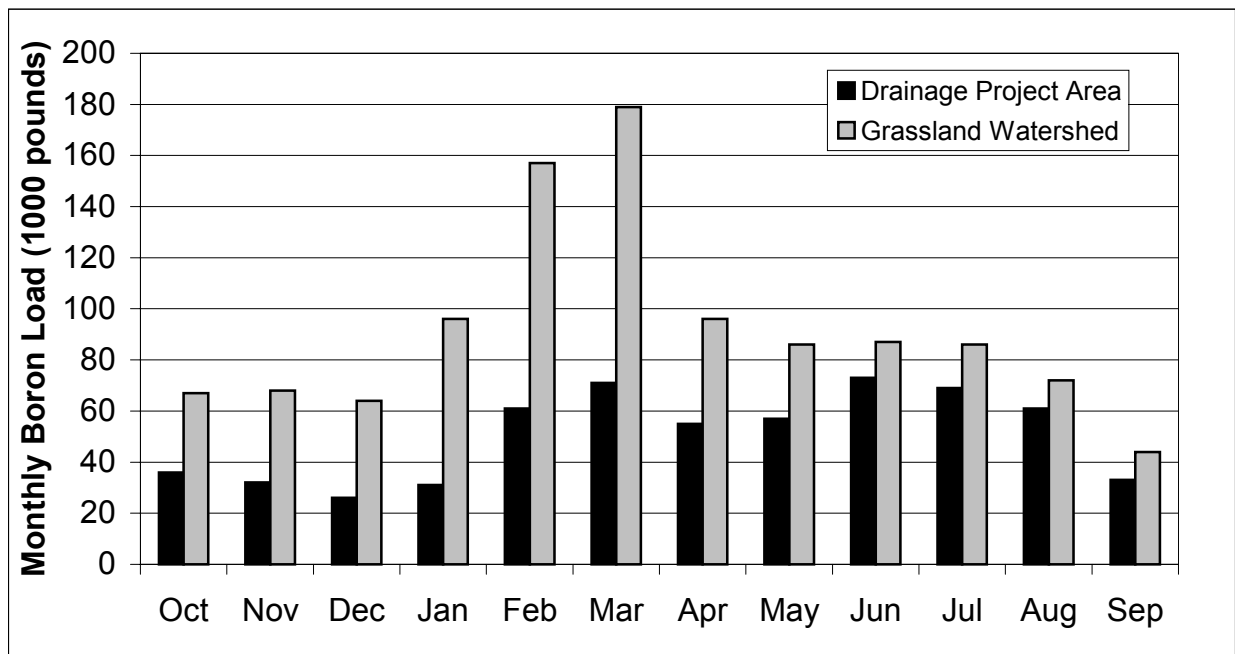
Figure 13B. Monthly Salt Loads from the DPA and Grassland Watershed: Water Year 2000



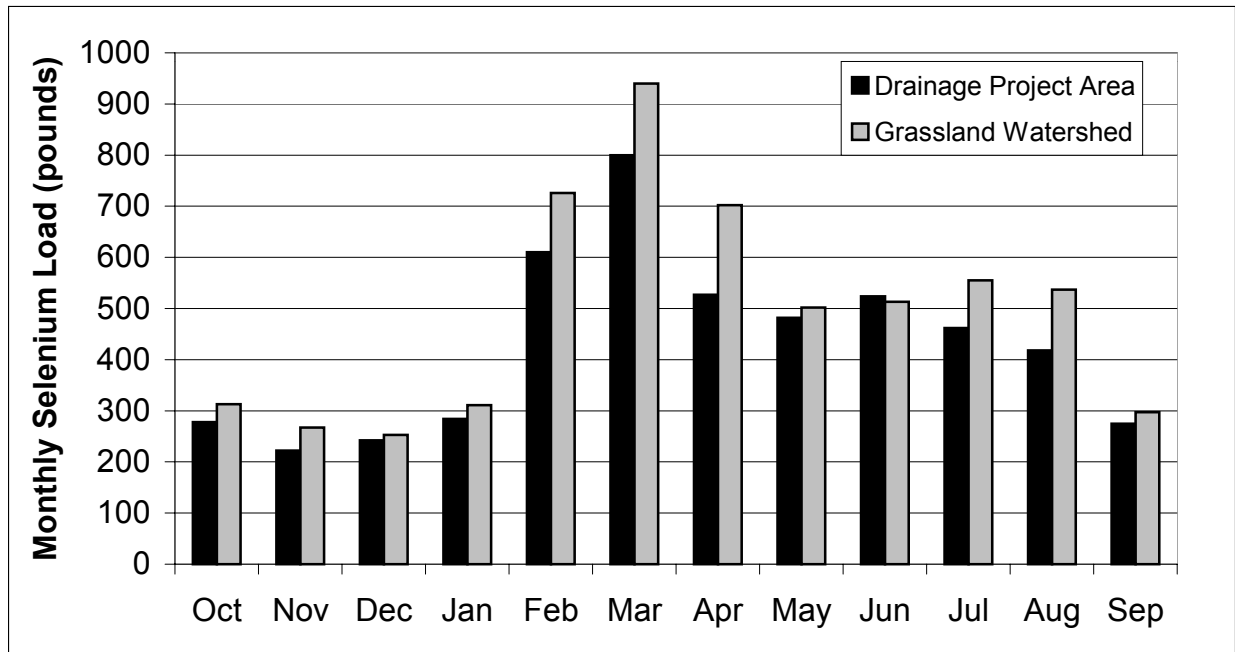
**Figure 14A. Monthly Boron Loads from the DPA and Grassland Watershed:
Water Year 1999**



**Figure 14B. Monthly Boron Loads from the DPA and Grassland Watershed:
Water Year 2000**



**Figure 15A. Monthly Selenium Loads from the DPA and Grassland Watershed:
Water Year 1999**



**Figure 15B. Monthly Selenium Loads from the DPA and Grassland Watershed:
Water Year 2000**

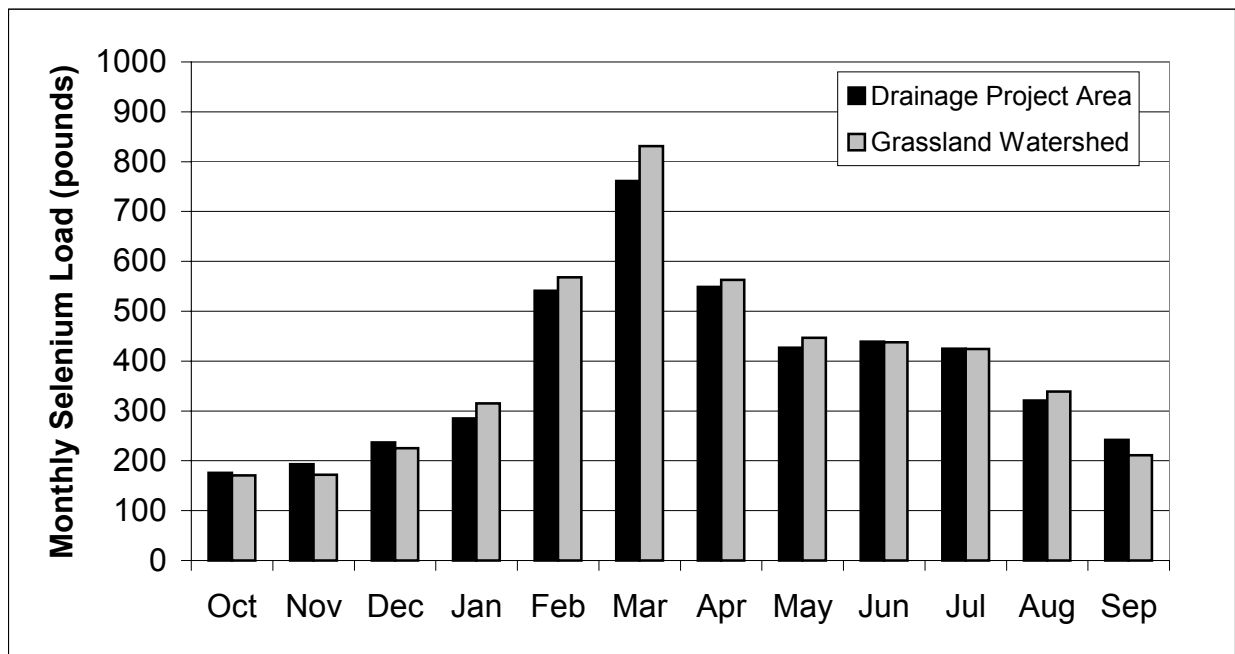


Figure 16. Annual Discharge from the DPA and the Grassland Watershed: Water Years 1986 through 2000

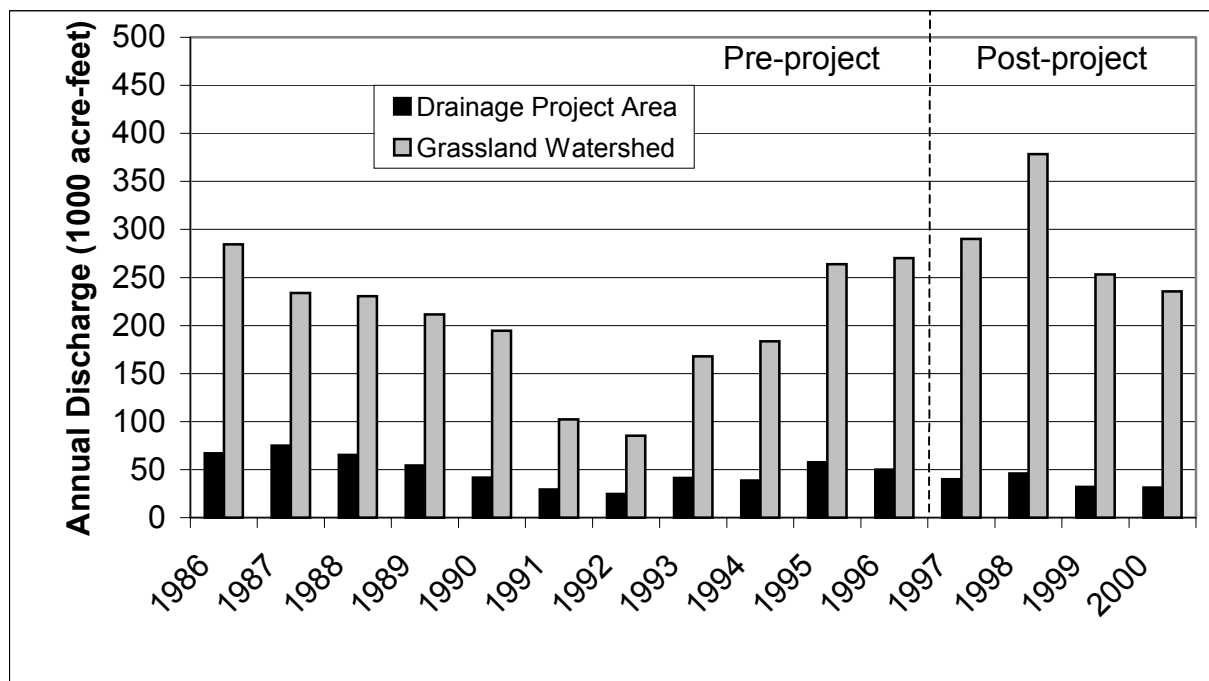


Figure 17. Annual Salt Load from the DPA and the Grassland Watershed: Water Years 1986 through 2000

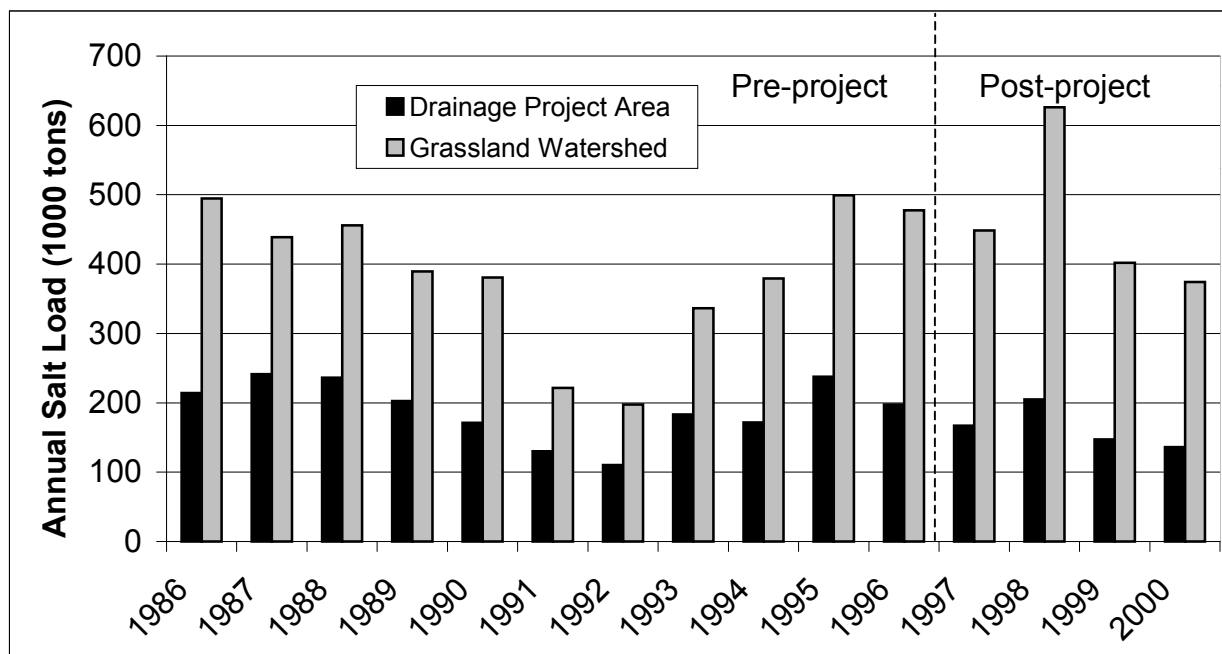


Figure 18. Annual Boron Load from the DPA and the Grassland Watershed: Water Years 1986 through 2000

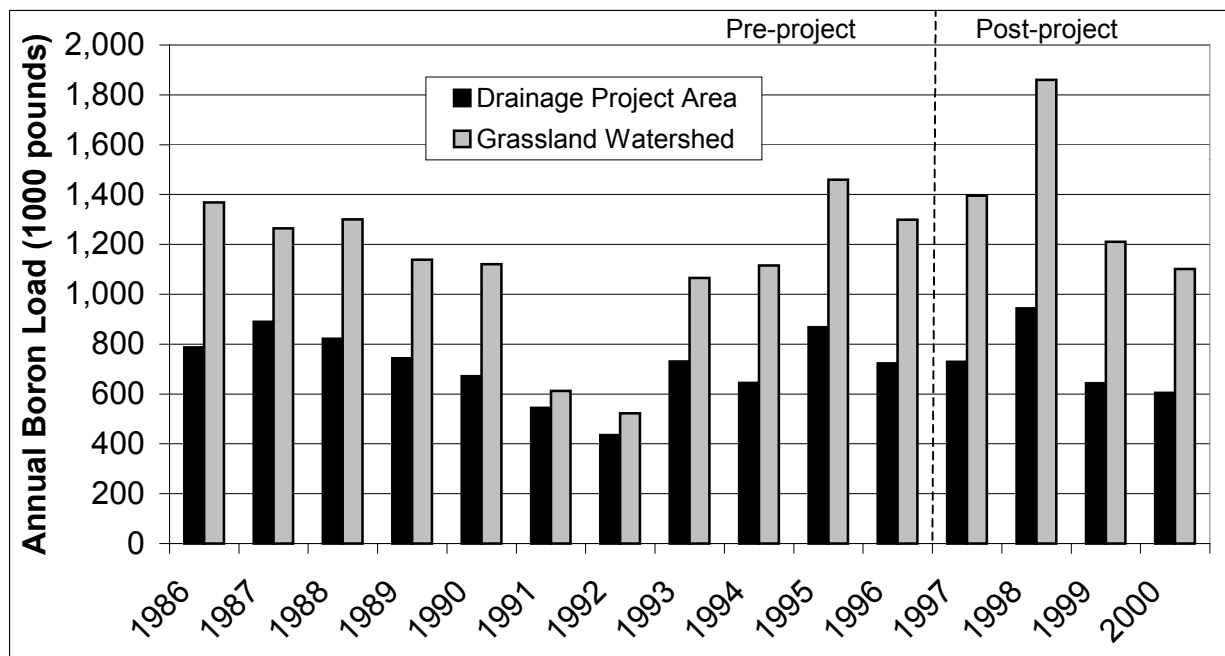
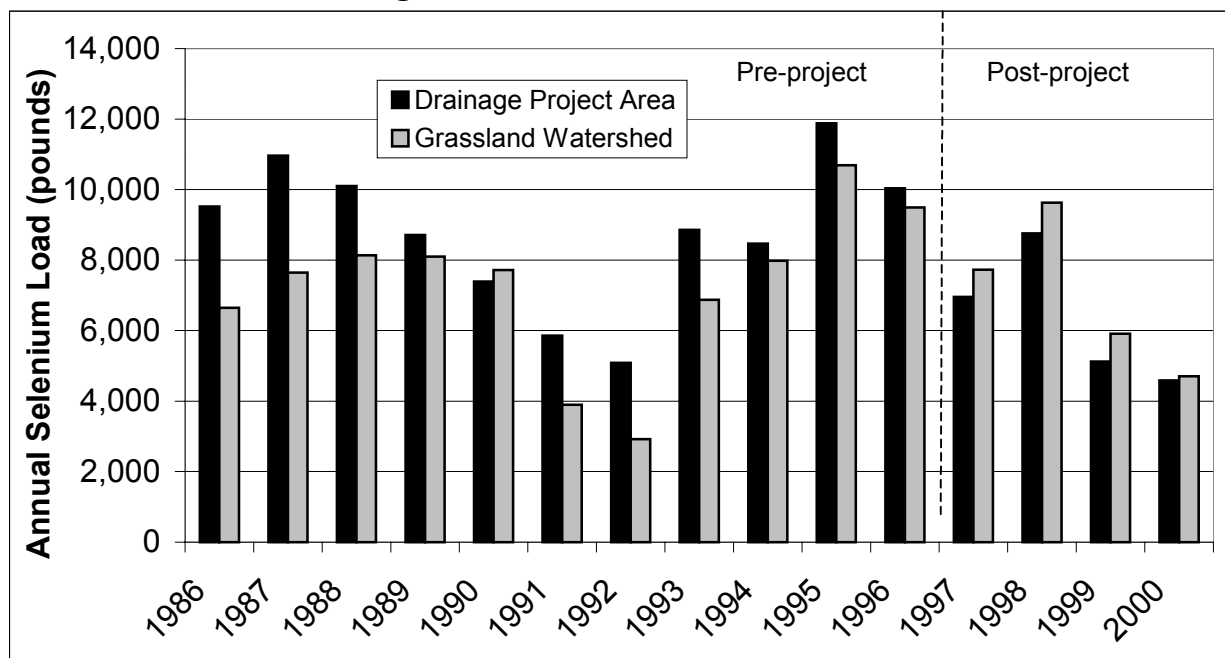


Figure 19. Annual Selenium Load from the DPA and the Grassland Watershed: Water Years 1986 through 2000



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APPENDIX A

Water Quality Data for Grab Samples: Water Years 1999 and 2000

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Legend of Abbreviations

B	Boron
Ca	Calcium
Cl	Chloride
Cr	Chromium
Cu	Copper
EC	Electrical Conductivity
HDNS	Total Hardness
Mg	Magnesium
Mo	Molybdenum
NA	data Not Available
Ni	Nickel
Pb	Lead
Se	Selenium
SO4	Sulfate
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
Zn	Zinc

Agatha Canal at Mallard Road (MER506)

**Location: Latitude 36.937, Longitude 120.702. In NE 1/4, NW 1/4, SW 1/4, Sec.7, T.11S, R.11E.
South of Santa Fe Grade at Brito, west of Mallard Road, 4.5 miles west of Dos Palos.**

WY 1999					WY 2000				
Date	Time	EC umhos/cm	Se ug/L	B mg/L	Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/07/98	12:45	260	1.4	0.15	10/06/99	11:35	416	0.6	0.16
10/14/98	11:20	312	2.1	0.19	10/13/99	11:40	504	1.0	0.18
10/21/98	12:45	252	2.7	0.18	10/20/99	11:27	575	0.9	0.36
10/28/98	11:30	275	2.0	0.19	10/27/99	10:46	539	1.2	0.33
11/04/98	12:45	342	2.8	0.24	11/03/99	11:25	572	1.3	0.32
11/11/98	12:40	303	1.1	0.22	11/11/99	11:56	627	1.8	0.36
11/18/98	12:47	360	1.6	0.24	11/17/99	11:15	551	1.2	0.27
11/24/98	11:50	461	1.3	0.29	11/22/99	12:40	640	1.1	0.36
12/02/98	11:45	167	0.6	0.15	12/01/99	11:30	576	0.6	0.29
12/09/98	11:50	164	0.5	0.16	12/08/99	11:30	802	0.5	0.74
12/16/98	12:40	141	<0.4	0.12	12/15/99	11:20	1330	0.7	1.5
12/22/98	11:45	199	<0.4	0.27	12/20/99	11:46	715	1.0	0.39
12/30/98	11:55	608	6.4	0.65	12/27/99	11:57	874	1.0	0.45
01/06/99	11:53	444	1.0	0.35	01/05/00	11:16	572	<0.4	0.19
01/13/99	11:20	1270	0.6	1.8	01/12/00	11:00	628	0.5	0.32
01/20/99	11:45	1310	1.1	2.0	01/19/00	11:25	811	0.7	0.37
01/27/99	11:45	1860	0.9	3.0	01/26/00	11:25	729	1.2	0.48
02/03/99	11:40	2070	0.9	3.7	02/02/00	11:20	943	1.0	0.99
02/10/99	11:55	645	1.5	0.74	02/09/00	11:10	1250	0.9	1.9
02/17/99	11:40	540	1.0	0.49	02/16/00	11:20	1220	1.5	1.6
02/24/99	11:50	275	0.6	0.28	02/23/00	11:50	1030	2.0	1.1
03/03/99	11:45	524	0.7	0.66	03/01/00	11:40	491	1.9	0.45
03/10/99	11:15	1850	0.5	4.1	03/08/00	11:32	302	0.9	0.27
03/17/99	11:45	2000	0.8	3.9	03/15/00	11:00	781	1.8	1.0
03/24/99	11:40	2130	1.5	3.3	03/22/00	11:15	569	0.5	0.76
03/31/99	11:50	853	2.2	1.1	03/29/00	10:40	187	0.5	0.17
04/07/99	11:45	659	3.1	0.61	04/05/00	11:05	439	2.2	0.40
04/14/99	11:57	582	2.7	0.63	04/12/00	11:00	599	1.0	0.38
04/21/99	11:50	900	2.0	1.3	04/19/00	11:10	584	1.8	0.47
04/28/99	11:55	514	1.7	0.41	04/26/00	11:11	601	2.3	0.43
05/05/99	11:55	396	1.0	0.25	05/03/00	10:50	527	1.5	0.30
05/12/99	11:45	359	1.4	0.20	05/10/00	10:56	544	1.7	0.27
05/19/99	12:00	419	1.2	0.25	05/17/00	11:16	512	1.2	0.23
05/26/99	12:00	461	1.0	0.24	05/24/00	11:26	545	1.3	0.31
06/02/99	11:57	452	1.0	0.24	05/31/00	11:48	545	1.2	0.30
06/09/99	12:00	419	1.0	0.21	06/07/00	11:05	498	1.6	0.27
06/16/99	11:00	454	1.2	0.26	06/14/00	11:00	480	1.4	0.25
06/23/99	11:35	484	1.1	0.25	06/21/00	11:00	514	1.5	0.33
06/30/99	11:15	387	1.1	0.21	06/28/00	11:00	429	1.2	0.25
07/07/99	11:42	442	1.0	0.24	07/05/00	11:10	424	1.0	0.27
07/14/99	8:45	329	1.0	0.17	07/12/00	11:15	406	0.7	0.23
07/21/99	11:30	352	1.0	0.23	07/19/00	11:00	404	1.1	0.24
07/28/99	11:30	417	0.8	0.23	07/26/00	11:05	408	1.2	0.22
08/04/99	11:21	315	0.8	0.17	08/02/00	11:05	413	0.8	0.25
08/11/99	11:30	345	0.9	0.18	08/09/00	11:00	373	0.9	0.19
08/18/99	11:30	303	0.8	0.19	08/16/00	10:50	392	0.8	0.21
08/25/99	11:30	316	1.3	0.17	08/23/00	11:00	368	0.8	0.20
09/01/99	11:45	406	1.3	0.23	08/30/00	11:00	439	<0.4	0.25
09/08/99	11:25	403	2.1	0.24	09/06/00	11:06	355	<0.4	0.19
09/15/99	11:30	387	1.1	0.19	09/13/00	11:05	366	0.7	0.19
09/22/99	11:20	500	0.8	0.20	09/20/00	11:39	362	0.9	0.16
09/29/99	11:30	662	2.1	0.35	09/27/00	11:00	490	1.0	0.23
Count		52	52	52	Count		52	52	52
Min		141	<0.4	0.12	Min		187	<0.4	0.16
Max		2130	6.4	4.1	Max		1330	2.3	1.9
Mean		602	1.4	0.70	Mean		582	1.1	0.43
Geo Mean		475	1.1	0.37	Geo Mean		543	1.0	0.34
Median		419	1.1	0.24	Median		541.5	1.0	0.30

Camp 13 Slough at Gauge Station (MER505)

Location: Latitude 36.939, Longitude 120.756. In SE 1/4, SE 1/4, SW 1/4, Sec.27, T.11S, R.11E.

150 feet north of CCID Main Canal, 6.4 miles west of Russel Avenue, 9.2 miles southeast of Los Banos, 6.7 miles southwest of South Dos Palos.

WY 1999					WY 2000				
Date	Time	EC umhos/cm	Se ug/L	B mg/L	Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/07/98	7:40	266	1.5	0.16	10/06/99	7:35	640	1.2	0.35
10/14/98	8:10	241	0.9	0.15	10/13/99	7:30	505	1.1	0.19
10/21/98	7:40	265	2.4	0.20	10/20/99	7:26	501	0.6	0.23
10/28/98	7:45	294	2.4	0.23	10/27/99	7:18	499	1.3	0.32
11/04/98	7:31	312	2.0	0.21	11/03/99	7:20	605	1.6	0.35
11/11/98	7:40	303	1.1	0.19	11/11/99	7:40	626	1.8	0.35
11/18/98	7:30	301	1.3	0.27	11/17/99	7:30	556	1.3	0.26
11/24/98	7:30	436	3.3	0.43	11/22/99	8:00	669	1.2	0.38
12/02/98	7:30	212	1.7	0.18	12/01/99	7:20	515	<0.4	0.24
12/09/98	7:30	194	0.7	0.23	12/08/99	7:20	2360	2.2	3.5
12/16/98	7:30	144	<0.4	0.14	12/15/99	7:20	640	0.5	0.20
12/22/98	7:30	157	<0.4	0.17	12/20/99	7:20	725	0.6	0.31
12/30/98	7:41	579	6.8	0.59	12/27/99	7:30	816	0.9	0.31
01/06/99	7:30	436	1.3	0.33	01/05/00	7:20	544	<0.4	0.22
01/13/99	7:30	434	1.2	0.35	01/12/00	7:20	938	1.2	0.57
01/20/99	7:30	544	0.9	0.44	01/19/00	7:30	608	0.5	0.32
01/27/99	7:40	1390	1.0	1.9	01/26/00	7:21	883	1.6	0.73
02/03/99	7:30	680	2.0	0.58	02/02/00	7:15	879	1.6	0.81
02/10/99	7:30	839	1.4	1.1	02/09/00	7:20	839	1.7	0.73
02/17/99	7:35	479	1.2	0.41	02/16/00	7:20	1030	2.1	1.1
02/24/99	7:35	551	1.0	0.70	02/23/00	7:20	1220	2.8	1.3
03/03/99	7:50	374	1.1	0.40	03/01/00	7:30	1030	2.6	1.1
03/10/99	7:30	518	1.7	0.52	03/08/00	7:21	585	1.4	0.69
03/17/99	7:30	686	2.3	0.86	03/15/00	7:30	731	1.9	1.0
03/24/99	7:30	1480	2.7	1.9	03/22/00	7:22	344	0.6	0.41
03/31/99	8:05	913	3.1	1.0	03/29/00	7:25	336	0.5	0.43
04/07/99	7:35	887	2.9	0.95	04/05/00	7:25	737	2.3	0.72
04/14/99	7:36	987	2.5	1.1	04/12/00	7:20	696	1.9	0.52
04/21/99	7:45	679	2.3	0.53	04/19/00	7:30	517	2.0	0.50
04/28/99	7:40	561	2.1	0.48	04/26/00	7:20	693	2.0	0.51
05/05/99	7:35	435	1.3	0.32	05/03/00	7:06	785	1.8	0.74
05/12/99	7:35	418	1.8	0.31	05/10/00	7:26	543	1.5	0.29
05/19/99	7:35	454	1.3	0.32	05/17/00	7:25	533	1.5	0.34
05/26/99	7:40	459	1.0	0.24	05/24/00	7:30	734	1.9	0.70
06/02/99	7:30	512	0.9	0.30	05/31/00	7:20	661	1.5	0.52
06/09/99	7:40	553	1.3	0.46	06/07/00	7:20	585	1.7	0.41
06/16/99	7:30	435	1.0	0.22	06/14/00	7:20	704	1.6	0.72
06/23/99	7:30	548	1.1	0.31	06/21/00	7:26	560	1.7	0.60
06/30/99	7:32	584	1.2	0.54	06/28/00	7:21	533	1.1	0.46
07/07/99	7:35	774	1.1	0.80	07/05/00	7:40	427	1.3	0.34
07/14/99	12:00	371	1.2	0.25	07/12/00	7:26	655	1.0	0.63
07/21/99	7:25	446	1.9	0.58	07/19/00	7:20	466	1.3	0.43
07/28/99	7:30	492	0.9	0.45	07/26/00	7:26	453	1.3	0.34
08/04/99	7:31	753	1.1	0.85	08/02/00	7:25	402	0.8	0.28
08/11/99	7:29	633	1.2	0.67	08/09/00	7:20	385	0.9	0.24
08/18/99	7:26	401	1.3	0.49	08/16/00	7:20	529	1.4	0.72
08/25/99	7:26	417	1.4	0.38	08/23/00	7:30	1570	0.9	2.80
09/01/99	7:20	385	1.3	0.36	08/30/00	7:20	488	0.5	0.29
09/08/99	7:20	467	2.7	0.30	09/06/00	7:27	396	<0.4	0.26
09/15/99	7:31	441	1.3	0.22	09/13/00	7:30	457	0.6	0.31
09/22/99	7:15	458	0.7	0.17	09/20/00	7:35	453	1.2	0.24
09/29/99	7:20	484	0.7	0.19	09/27/00	7:20	368	0.8	0.15
Count		52	52	52	Count		52	52	52
Min		144	<0.4	0.14	Min		336	<0.4	0.15
Max		1480	6.8	1.9	Max		2360	2.8	3.5
Mean		520	1.6	0.49	Mean		672	1.3	0.59
Geo Mean		466	1.4	0.39	Geo Mean		622	1.1	0.46
Median		458.5	1.3	0.37	Median		595	1.3	0.41

CCID Main @ Russell Avenue (MER510)

Location: Latitude 36.924, Longitude 120.653. In SE 1/4, SE 1/4, SW 1/4, Sec.33, T.11S, R.12E.,
2.7 miles south of Dos Palos.

WY 1999				
Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/07/98	9:50	253	0.9	0.14
10/14/98	10:00	299	1.9	0.18
10/21/98	10:00	218	1.2	0.13
10/28/98	9:45	212	1.5	0.18
11/04/98	10:00	237	1.0	0.13
11/11/98	10:00	283	2.3	0.22
11/18/98	9:30	412	1.7	0.29
11/24/98	9:10	405	2.9	0.39
12/02/98	10:00	277	1.2	0.22
12/09/98	10:00	114	<0.4	0.14
12/16/98	10:15	101	<0.4	0.09
12/22/98	9:20	142	<0.4	0.06
12/30/98	9:20	329	3.2	0.25
01/06/99	9:30	274	0.7	0.19
01/13/99	9:00	373	0.9	0.23
01/20/99	9:30	509	1.1	0.31
01/27/99	9:10	448	1.8	0.29
02/03/99	9:10	407	2.5	0.24
02/10/99	9:30	380	1.5	0.24
02/17/99	9:10	401	1.4	0.26
02/24/99	9:35	140	1.0	0.12
03/03/99	9:45	368	2.0	0.19
03/10/99	9:20	392	1.8	0.27
03/17/99	9:20	433	2.0	0.33
03/24/99	9:15	401	2.5	0.30
03/31/99	9:55	502	2.5	0.33
04/07/99	9:30	614	2.7	0.42
04/14/99	9:30	629	2.7	0.41
04/21/99	9:20	571	1.9	0.36
04/28/99	9:45	433	1.5	0.27
05/05/99	9:30	406	0.9	0.20
05/12/99	9:40	407	1.3	0.21
05/19/99	9:30	383	1.2	0.21
05/26/99	9:50	468	1.1	0.25
06/02/99	9:30	499	0.8	0.24
06/09/99	9:50	384	0.8	0.20
06/16/99	9:00	422	1.0	0.22
06/23/99	9:20	386	1.0	0.21
06/30/99	9:10	461	1.2	0.27
07/07/99	9:10	359	0.9	0.19
07/14/99	9:50	308	0.8	0.15
07/21/99	9:30	350	0.8	0.20
07/28/99	9:10	317	0.8	0.18
08/04/99	9:20	435	1.0	0.23
08/11/99	9:20	418	0.9	0.22
08/18/99	9:25	356	0.8	0.22
08/25/99	9:21	391	1.0	0.21
09/01/99	9:26	337	1.2	0.20
09/08/99	9:30	421	1.5	0.26
09/15/99	9:15	510	1.2	0.26
09/22/99	8:50	514	0.9	0.23
09/29/99	9:10	558	1.5	0.27
Count		52	52	52
Min		101	<0.4	0.06
Max		629	3.2	0.42
Mean		378	1.4	0.23
Geo Mean		355	1.2	0.22
Median		391.5	1.2	0.22

WY 2000				
Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/06/99	9:40	463	0.8	0.19
10/13/99	9:30	564	1.1	0.30
10/20/99	9:11	398	1.0	0.16
10/27/99	8:34	433	0.6	0.17
11/03/99	9:30	508	0.6	0.22
11/11/99	10:45	645	1.2	0.35
11/17/99	9:00	493	1.1	0.22
11/22/99	9:40	709	1.7	0.42
12/01/99	9:20	484	0.8	0.19
12/08/99	9:15	583	1.6	0.28
12/15/99	9:00	941	1.0	0.40
12/20/99	9:30	985	1.0	0.40
12/27/99	9:45	1020	1.0	0.41
01/05/00	9:00	1070	0.8	0.40
01/12/00	8:55	1080	0.8	0.43
01/19/00	9:30	1290	2.0	0.52
01/26/00	9:30	462	1.0	0.23
02/02/00	9:00	558	1.2	0.32
02/09/00	8:50	695	2.3	0.45
02/16/00	9:15	679	1.5	0.48
02/23/00	9:15	365	1.3	0.23
03/01/00	9:30	324	1.3	0.18
03/08/00	9:30	359	2.2	0.26
03/15/00	8:50	242	1.0	0.11
03/22/00	9:15	100	0.7	0.06
03/29/00	9:00	89	0.6	<0.05
04/05/00	8:55	562	1.5	0.35
04/12/00	8:00	437	1.3	0.24
04/19/00	9:10	446	1.7	0.24
04/26/00	9:16	514	1.9	0.29
05/03/00	8:40	557	1.5	0.29
05/10/00	8:45	526	1.5	0.24
05/17/00	8:45	500	1.1	0.23
05/24/00	9:20	533	1.0	0.25
05/31/00	8:45	645	1.2	0.35
06/07/00	9:06	446	1.4	0.24
06/14/00	8:44	543	1.5	0.28
06/21/00	9:05	311	1.4	0.20
06/28/00	9:00	443	1.2	0.23
07/05/00	9:20	387	1.0	0.27
07/12/00	8:50	470	1.1	0.27
07/19/00	8:47	522	1.3	0.31
07/26/00	9:11	413	1.3	0.24
08/02/00	8:50	315	0.7	0.16
08/09/00	8:50	429	1.0	0.21
08/16/00	8:45	341	0.5	0.17
08/23/00	9:45	378	0.7	0.20
08/30/00	8:50	327	<0.4	0.17
09/06/00	9:00	416	0.5	0.25
09/13/00	9:00	362	0.7	0.20
09/20/00	9:09	357	0.7	0.14
09/27/00	8:46	398	1.6	0.16
Count		52	52	52
Min		89	<0.4	<0.05
Max		1290	2.3	0.52
Mean		521	1.1	0.26
Geo Mean		471	1.1	0.24
Median		466.5	1.1	0.24

Santa Fe Canal at weir (MER545)

**Location: Latitude 37.099, Longitude 120.827. In NE 1/4, NE 1/4, Sec.1, T.10S, R.10E.,
0.3 miles east of Lander Avenue, 3 miles north of Gustine.**

WY 1999					WY 2000				
Date	Time	EC umhos/cm	Se ug/L	B mg/L	Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/07/98	13:15	569	1.1	0.60	10/06/99	12:40	630	1.3	0.43
10/14/98	13:00	634	2.0	0.69	10/13/99	12:40	742	0.8	0.65
10/21/98	13:20	1050	1.1	1.3	10/20/99	12:40	947	0.9	0.96
10/28/98	12:50	877	1.6	1.1	10/27/99	11:20	997	0.8	1.1
11/04/98	13:10	843	1.4	1.0	11/03/99	12:40	906	0.8	0.84
11/11/98	13:25	876	1.3	1.1	11/11/99	13:30	969	0.7	0.94
11/18/98	13:10	1010	1.1	1.4	11/17/99	11:40	1160	0.9	1.3
11/24/98	13:00	1080	1.0	1.5	11/22/99	13:10	1200	0.8	1.3
12/02/98	12:40	1150	0.8	1.6	12/01/99	12:50	1140	0.7	1.2
12/09/98	13:10	1160	0.8	1.5	12/08/99	12:10	1700	1.3	1.9
12/16/98	13:30	1270	0.8	1.7	12/15/99	11:55	2380	1.1	2.7
12/22/98	13:00	1550	0.8	2.2	12/20/99	13:00	2120	0.8	2.4
12/30/98	13:00	1560	1.0	2.2	12/27/99	13:11	1820	0.9	1.9
01/06/99	13:00	1730	2.2	2.2	01/05/00	11:50	1450	0.5	1.4
01/13/99	11:45	1960	2.0	2.4	01/12/00	11:20	1900	0.5	2.1
01/20/99	12:40	1700	1.1	2.2	01/19/00	12:00	1640	0.6	2.0
01/27/99	13:20	1850	2.5	2.3	01/26/00	12:40	1930	0.8	2.5
02/03/99	12:40	2100	1.0	2.8	02/02/00	12:30	1930	0.9	2.4
02/10/99	13:30	1690	1.3	2.1	02/09/00	11:50	2670	1.8	3.5
02/17/99	13:00	1960	1.0	2.6	02/16/00	12:45	2610	1.9	3.3
02/24/99	13:00	1880	1.1	2.5	02/23/00	12:55	2220	1.8	2.9
03/03/99	12:40	1640	1.3	2.1	03/01/00	12:50	2410	2.4	3.0
03/10/99	12:45	1780	1.6	2.5	03/08/00	12:00	2320	1.3	2.7
03/17/99	13:20	2160	1.5	3.4	03/15/00	11:45	2230	1.2	2.7
03/24/99	13:00	2050	1.7	2.7	03/22/00	11:50	2470	1.1	3.9
03/31/99	13:00	2580	1.6	3.8	03/29/00	11:50	1860	0.5	2.8
04/07/99	13:00	2320	1.8	3.4	04/05/00	11:40	2220	1.2	3.3
04/14/99	13:16	2380	1.6	3.3	04/12/00	11:40	942	1.4	0.95
04/21/99	13:00	1670	2.0	2.5	04/19/00	11:40	1290	2.3	1.5
04/28/99	13:10	920	2.2	0.92	04/26/00	11:45	1740	2.0	1.8
05/05/99	13:05	950	1.4	0.81	05/03/00	11:25	1150	2.3	1.0
05/12/99	13:10	968	1.7	0.99	05/10/00	11:30	1020	2.1	0.88
05/19/99	13:15	840	1.4	0.81	05/17/00	11:50	1170	1.5	1.1
05/26/99	13:20	1060	1.7	1.3	05/24/00	11:50	1020	1.5	0.96
06/02/99	13:00	791	1.3	0.71	05/31/00	13:00	1060	1.8	1.0
06/09/99	13:10	1230	1.8	1.5	06/07/00	11:40	982	2.1	0.83
06/16/99	11:30	1150	2.1	1.4	06/14/00	11:55	1050	1.8	0.79
06/23/99	NA	1100	1.8	1.4	06/21/00	11:30	745	1.7	0.49
06/30/99	11:35	1150	1.9	1.5	06/28/00	11:40	1160	2.2	1.5
07/07/99	12:40	1140	2.0	1.6	07/05/00	11:40	1290	2.5	2.1
07/14/99	8:30	979	1.7	1.4	07/12/00	11:35	1070	1.7	1.4
07/21/99	11:30	1320	2.1	2.4	07/19/00	11:45	924	1.8	1.2
07/28/99	12:35	1060	1.6	1.6	07/26/00	11:30	1050	2.0	1.2
08/04/99	11:30	1400	2.5	2.5	08/02/00	11:35	1050	1.8	1.7
08/11/99	12:00	1140	2.1	1.6	08/09/00	11:50	1110	1.9	1.6
08/18/99	11:40	1250	2.5	2.2	08/16/00	11:40	903	1.4	1.0
08/25/99	12:50	1070	2.1	1.1	08/23/00	11:40	1200	1.8	1.9
09/01/99	12:50	516	1.6	0.35	08/30/00	11:45	953	0.7	0.96
09/08/99	12:00	536	1.8	0.44	09/06/00	11:40	583	0.5	0.45
09/15/99	13:00	514	1.2	0.34	09/13/00	11:45	481	0.5	0.33
09/22/99	12:00	611	1.0	0.41	09/20/00	12:13	466	1.0	0.31
09/29/99	12:45	771	1.7	0.60	09/27/00	12:00	443	2.0	0.27
Count		52	52	52	Count		52	52	52
Min		514	0.8	0.34	Min		443	0.5	0.27
Max		2580	2.5	3.8	Max		2670	2.5	3.9
Mean		1300	1.6	1.7	Mean		1370	1.4	1.6
Geo Mean		1200	1.5	1.5	Geo Mean		1240	1.2	1.3
Median		1150	1.6	1.6	Median		1153.5	1.3	1.4

San Luis Canal at splits (MER563)

Location: Latitude 37.098, Longitude 120.827. In SE 1/4, SW 1/4, Sec.36, T.10S, R.10E.

3 miles northeast of Los Banos at the Los Banos Wildlife Refuge.

WY 1999				
Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/07/98	13:20	436	1.5	0.39
10/14/98	13:10	401	2.3	0.35
10/21/98	13:30	429	2.5	0.43
10/28/98	12:55	394	1.2	0.37
11/04/98	13:20	636	2.3	0.57
11/11/98	13:20	344	1.4	0.26
11/18/98	13:25	301	1.3	0.21
11/24/98	13:20	459	3.1	0.41
12/02/98	12:50	342	1.6	0.29
12/09/98	13:15	349	1.0	0.35
12/16/98	13:45	261	0.5	0.24
12/22/98	13:15	116	<0.4	0.09
12/30/98	13:20	318	2.9	0.23
01/06/99	12:50	568	1.4	0.47
01/13/99	12:00	631	1.6	0.54
01/20/99	12:50	560	1.3	0.39
01/27/99	13:15	620	1.9	0.41
02/03/99	12:50	982	1.9	0.87
02/10/99	13:10	1008	3.2	0.93
02/17/99	13:30	786	1.9	0.76
02/24/99	13:10	690	1.8	0.69
03/03/99	12:50	460	1.9	0.33
03/10/99	13:00	856	2.2	0.90
03/17/99	13:00	730	1.9	0.71
03/24/99	13:10	618	2.2	0.48
03/31/99	13:20	889	2.9	0.86
04/07/99	13:30	847	2.9	0.82
04/14/99	13:30	685	2.7	0.49
04/21/99	13:15	1040	2.6	1.0
04/28/99	13:20	627	1.9	0.50
05/05/99	13:20	656	1.2	0.47
05/12/99	13:20	569	2.1	0.37
05/19/99	13:30	497	1.4	0.30
05/26/99	13:30	485	1.3	0.31
06/02/99	13:20	671	1.1	0.50
06/09/99	13:20	2170	3.0	2.7
06/16/99	11:40	1560	2.4	1.6
06/23/99	NA	1650	2.2	1.8
06/30/99	11:45	1820	2.4	2.1
07/07/99	13:00	1310	2.3	1.4
07/14/99	8:15	965	2.0	0.97
07/21/99	12:00	1330	2.1	1.4
07/28/99	12:45	1520	2.1	1.8
08/04/99	11:50	960	1.7	0.99
08/11/99	12:20	867	1.5	0.94
08/18/99	11:50	806	1.5	0.89
08/25/99	12:40	744	1.6	0.71
09/01/99	12:40	504	1.4	0.43
09/08/99	11:45	528	2.5	0.41
09/15/99	12:40	470	1.7	0.27
09/22/99	11:35	522	1.1	0.29
09/29/99	12:55	513	0.9	0.22
Count		52	52	52
Min		116	<0.4	0.09
Max		2170	3.2	2.7
Mean		740	1.9	0.70
Geo Mean		643	1.7	0.55
Median		629	1.9	0.49

WY 2000				
Date	Time	EC umhos/cm	Se ug/L	B mg/L
10/06/99	12:00	554	0.9	0.25
10/13/99	12:50	530	0.9	0.29
10/20/99	12:43	536	1.1	0.33
10/27/99	11:23	589	0.9	0.38
11/03/99	12:50	711	1.5	NA
11/11/99	13:15	715	1.1	0.52
11/17/99	11:30	884	1.6	0.70
11/22/99	13:20	1070	1.6	1.0
12/01/99	12:40	872	0.8	0.65
12/08/99	11:45	829	1.3	0.67
12/15/99	11:40	798	1.8	0.58
12/20/99	12:45	690	0.5	0.32
12/27/99	13:00	898	0.8	0.44
01/05/00	11:40	511	<0.4	0.16
01/12/00	11:40	935	1.0	0.60
01/19/00	11:45	824	0.8	0.56
01/26/00	12:50	1200	1.3	0.75
02/02/00	12:00	2170	3.3	2.9
02/09/00	11:40	2430	3.6	3.2
02/16/00	12:30	1300	2.1	1.5
02/23/00	12:45	983	2.4	0.89
03/01/00	12:40	1010	3.5	0.93
03/08/00	11:45	814	1.6	0.86
03/15/00	11:25	606	2.1	0.57
03/22/00	11:40	647	1.1	0.72
03/29/00	11:40	394	0.6	0.39
04/05/00	11:30	873	2.7	0.87
04/12/00	11:30	812	1.3	0.69
04/19/00	11:30	664	1.8	0.54
04/26/00	11:35	648	2.4	0.47
05/03/00	11:15	782	1.7	0.63
05/10/00	11:20	831	2.0	0.65
05/17/00	11:40	800	1.5	0.65
05/24/00	11:40	831	1.5	0.69
05/31/00	12:50	866	1.5	0.73
06/07/00	11:30	906	2.0	0.73
06/14/00	11:40	1310	2.6	1.2
06/21/00	11:40	1310	2.7	1.4
06/28/00	11:30	1190	2.3	1.2
07/05/00	11:50	1260	2.2	1.3
07/12/00	11:45	1310	2.2	1.5
07/19/00	11:30	1170	2.3	1.3
07/26/00	11:40	1320	2.6	1.5
08/02/00	11:45	1190	1.8	1.3
08/09/00	11:30	1020	1.8	0.97
08/16/00	11:20	1220	1.8	1.1
08/23/00	11:30	1250	1.7	1.4
08/30/00	11:30	1060	0.8	1.0
09/06/00	11:20	452	0.4	0.30
09/13/00	11:35	462	0.6	0.30
09/20/00	12:13	388	0.8	0.19
09/27/00	11:30	467	1.8	0.27
Count		52	52	51
Min		388	<0.4	0.16
Max		2430	3.6	3.2
Mean		921	1.6	0.84
Geo Mean		853	1.4	0.69
Median		848.5	1.6	0.69

Mud Slough Upstream of San Luis Drain (MER536)

Location: Latitude 37.254, Longitude 120.907. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140; located within Kesterson N.W.R.

WY 1999																	
Date	Time	Temp C	pH	EC umhos/cm	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg
ug/L												mg/L					
10/01/98	9:35	20.6	7.8	657	0.5							0.49					
10/08/98	11:25	21.7	7.9	676	0.7							0.55					
10/15/98	10:10	17.8	7.9	735	0.7							0.62					
10/22/98	11:15	20.0	7.8	898	0.7							0.75					
10/29/98	14:30	20.0	NA	862	0.6	4.0	3.9	2.4	8.2	<5	5.4	0.82	94	100	190	37	23
11/05/98	12:10	16.7	8.1	947	0.7							0.84					
11/12/98	10:05	12.2	8.1	1000	0.7							0.87					
11/19/98	9:30	12.8	8.1	1160	0.5							1.0					
11/24/98	15:35	15.6	8.1	1280	0.5	5.3						1.1					
12/03/98	11:40	14.4	NA	1300	<0.4							1.1					
12/09/98	16:40	10.0	NA	1260	0.5							1.1					
12/17/98	9:40	9.4	7.8	1430	0.5							1.2					
12/22/98	13:20	6.7	8.3	1470	<0.4							1.2					
12/31/98	12:25	11.7	8.0	1510	<0.4	6.1						1.3					
01/07/99	12:00	6.1	8.0	1630	0.4							1.4					
01/14/99	13:40	7.2	NA	1700	<0.4							1.4					
01/21/99	11:20	14.0	7.9	1180	0.8							1.0					
01/28/99	12:35	8.7	8.1	1590	0.6	7.8	4.5	5.0	9.3	<5	NA	1.4	200	250	296	<5	NA
02/04/99	10:15	10.6	8.1	1780	0.4	7.2						1.5					
02/11/99	11:10	9.0	8.1	1340	0.8							1.2					
02/18/99	12:45	13.7	8.0	1680	0.9							1.5					
02/25/99	11:05	15.0	7.9	1700	0.6	8.1						1.7					
03/04/99	10:40	12.6	8.1	1700	0.7							1.6					
03/11/99	11:25	13.2	8.1	1920	0.7							2.0					
03/18/99	11:10	16.5	8.1	2090	0.7							1.9					
03/25/99	11:45	16.3	7.9	1860	0.8	7.8						1.9					
03/30/99	16:30	16.2	8.8	2190	0.9							2.1					
04/08/99	12:30	11.1	8.5	2300	1.0							2.2					
04/15/99	12:00	22.3	8.4	2130	1.1							2.0					
04/22/99	12:35	19.0	6.8	2010	1.6							2.0					
04/29/99	10:52	13.6	8.5	835	2.6	4.6	72	49	100	14	120	0.71	100	150	240	43	31
05/06/99	10:40	22.5	8.4	1180	1.2							0.96					
05/13/99	10:24	19.4	8.2	1710	1.1							1.4					
05/20/99	11:15	21.9	7.9	1140	0.9							0.91					
05/27/99	11:05	NA	NA	1160	0.9	9.7						0.98					
06/03/99	8:37	15.7	8.2	1160	0.9							0.94					
06/10/99	10:06	23.0	8.1	1420	1.0							1.2					
06/17/99	10:51	25.6	8.4	1910	1.1							1.7					
06/24/99	8:07	23.4	7.3	1750	1.7	12						1.6					
07/01/99	12:45	29.8	8.4	1710	2.2							1.8					
07/08/99	10:50	25.6	8.6	1560	1.8							1.5					
07/15/99	13:55	31.2	8.2	1260	2.0							1.3					
07/22/99	10:43	22.9	8.6	1670	1.7							1.9					
07/29/99	8:00	19.3	7.6	1800	1.9	14	9.6	7.7	15	<5	18	2.1	200	370	380	70	50
08/05/99	10:15	23.8	8.2	1860	1.8							2.1					
08/12/99	10:30	22.4	8.2	1870	1.5							1.7					
08/19/99	9:29	20.5	8.0	2040	1.5							1.7					
08/26/99	6:30	22.2	6.1	1190	1.4	8.5						1.2					
09/02/99	11:55	24.1	8.1	898	0.6							0.71					
09/09/99	11:50	25.9	8.2	890	0.7							0.70					
09/16/99	10:45	22.5	8.0	697	0.5							0.48					
09/23/99	11:50	25.7	8.0	766	<0.4							0.49					
09/30/99	10:35	22.5	7.6	873	0.5	7.0						0.62					
Count		52	48	53	53	13	4	4	4	4	3	53	4	4	4	4	3
Min		6.1	6.1	657	<0.4	4.0	3.9	2.4	8.2	<5	5.4	0.48	94	100	190	37	23
Max		31.2	8.8	2300	2.6	14	72	49	100	14	120	2.2	200	370	380	70	50
Mean		17.8	8.0	1420	0.9	7.8	23	16	33	5.4	48	1.3	149	218	277	38	35
Geo Mean		16.6	8.0	1350	0.8	7.4	10	8.2	18	3.8	23	1.2	139	193	268	23	33
Median		18.4	8.1	1430	0.7	7.8	7.1	6.4	12	2.5	18	1.2	150	200	268	40	31

Mud Slough Upstream of San Luis Drain (MER536)

Location: Latitude 37.254, Longitude 120.907. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140; located within Kesterson N.W.R.

WY 2000

Date	Time	Temp C	pH	EC umhos/cm	Se ug/L	Mo	Cr	Cu	Ni	Pb	Zn	B mg/L	Cl	SO4	HDNS	Ca	Mg
10/07/99	12:30	20.2	7.9	788	0.4							0.54					
10/14/99	10:50	20.9	7.4	832	0.4							0.62					
10/21/99	11:05	18.9	7.8	842	<0.4							0.63					
10/28/99	12:30	18.9	7.6	961	<0.4	3.3	2.9	2.5	6.7	<5	4.8	0.69	110	81	200	40	26
11/04/99	11:45	19.3	8.1	1060	0.5							0.83					
11/11/99	10:40	16.1	NA	1080	<0.4							0.82					
11/18/99	13:25	15.7	7.7	1210	0.6							1.0					
11/23/99	11:45	11.4	7.8	1300	<0.4	5.5						1.0					
12/02/99	11:35	11.7	7.6	1410	<0.4							1.1					
12/09/99	9:10	8.4	7.7	1600	<0.4							1.2					
12/16/99	11:45	9.2	7.8	1640	<0.4							1.2					
12/21/99	12:55	10.4	7.9	1620	<0.4							1.3					
12/28/99	10:55	9.8	7.9	1670	<0.4	6.3						1.2					
01/06/00	11:30	7.5	8.1	1610	<0.4							1.2					
01/13/00	12:10	11.3	8.0	1680	<0.4							1.3					
01/20/00	10:30	13.8	7.9	1680	0.4							1.3					
01/27/00	10:35	12.8	6.7	1530	<0.4	6.4	3.2	3.4	7.5	<5	6.6	1.2	190	210	260	47	36
02/03/00	11:20	13.8	7.9	1720	1.1							1.5					
02/10/00	12:30	15.0	6.7	1800	0.6							1.5					
02/17/00	9:50	12.5	7.5	1380	0.7							1.3					
02/24/00	12:00	10.9	7.9	1280	0.9	5.8						1.2					
03/02/00	10:10	12.3	8.0	1620	0.8							1.4					
03/09/00	12:00	12.8	8.1	1990	0.7							1.8					
03/15/00	17:40	19.0	NA	1760	0.8							1.6					
03/23/00	7:50	15.0	7.7	2120	1.0							1.9					
03/30/00	10:40	16.6	8.2	2400	<0.4	11	6.9	6.1	13	<5	9.7	2.1					
04/06/00	12:35	21.1	8.3	2240	1.1		3.2	4.9	8.7	<5	3.7	2.1					
04/13/00	11:30	21.6	8.1	2580	0.8		3.4	5.0	8.0	<5	4.5	2.3					
04/20/00	11:05	18.9	8.2	1660	1.4		7.0	5.6	12	<5	8.3	1.6					
04/27/00	11:43	23.8	NA	2160	1.2	13	3.7	3.8	6.8	<5	2.4	1.6	270	410	370	64	52
05/04/00	10:55	22.9	8.0	2620	1.2		3.1	3.7	6.6	<5	<2	2.2					
05/11/00	11:30	18.8	8.0	1530	2.4		2.9	3.7	6.4	<5	3.2	1.2					
05/18/00	10:25	22.3	7.9	1250	0.9		3.2	4.9	8.0	<5	5.8	0.98					
05/25/00	8:07	22.8	8.0	1650	1.0	14	3.8	3.9	8.2	<5	4.8	1.5					
06/01/00	7:15	18.4	7.5	1230	0.8		3.8	3.3	7.4	<5	7.6	0.94					
06/08/00	11:15	21.6	8.1	1800	1.4		5.4	4.9	9.9	<5	5.9	1.6					
06/15/00	12:25	30.6	8.5	1880	1.7		6.9	6.7	12	<5	7.7	1.7					
06/22/00	10:45	28.7	8.3	1660	1.7		5.2	6.1	12	<5	9.0	1.5					
06/29/00	11:30	29.1	8.5	2370	1.3	18	5.3	6.2	12	<5	6.6	2.1					
07/06/00	13:20	27.0	8.8	1440	1.6							1.4					
07/13/00	10:10	22.6	8.4	1680	1.0							1.7					
07/20/00	11:35	25.5	8.6	1670	0.8							1.6					
07/27/00	14:45	28.4	8.7	1530	1.0	8.3	1.2	2.4	<5	<5	NA	1.5	180	210	290	48	40
08/03/00	10:20	26.8	8.3	2580	0.7							2.2					
08/10/00	8:20	19.5	7.0	1410	1.7							1.7					
08/17/00	12:00	27.4	8.2	1080	1.0							1.0					
08/24/00	10:18	21.4	8.2	1450	2.0							1.3					
08/31/00	12:30	23.8	8.4	1300	<0.4	8.1	2.3	2.7	7.2	<5	3.4	1.2	32	41	260	45	36
09/07/00	10:50	22.7	8.5	689	<0.4							0.52					
09/14/00	11:30	25.8	8.1	654	<0.4							0.50					
09/21/00	10:35	23.1	6.7	620	<0.4							0.42					
09/28/00	14:10	25.7	8.0	816	0.7	8.2	3.7	2.8	7.9	<5	4.9	0.60	97	96	260	55	30
Count		52	49	52	52	12	19	19	19	19	18	52	6	6	6	6	6
Min		7.5	6.7	620	<0.4	3.3	1.2	2.4	6.4	<5	<2	0.42	32	41	200	40	26
Max		30.6	8.8	2620	2.4	18	7.0	6.7	13	<5	10	2.3	270	410	370	64	52
Mean		18.9	7.9	1540	0.8	8.9	4.1	4.3	8.6	2.5	5.6	1.3	147	175	273	50	37
Geo Mean		17.9	7.9	1460	0.6	8.1	3.7	4.1	8.1	2.5	4.9	1.2	121	134	269	49	36
Median		19.2	8.0	1610	0.7	8.2	3.7	3.9	8.0	2.5	5.4	1.3	145	153	260	47.5	36

Mud Slough (north) at San Luis Drain (MER542)

Location: Latitude 37.264, Longitude 120.906. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140; located within Kesterson N.W.R.

WY 1999

Date	Time	Temp C	pH	EC umhos/cm	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS
10/01/98	9:20	21.1	7.9	1450	6.8							1.8						NA
10/08/98	11:00	20.0	8.3	1410	7.3							1.8						NA
10/15/98	9:45	18.3	8.1	1630	8.8							1.9						NA
10/22/98	10:50	18.9	7.9	2100	12.3							2.6						NA
10/29/98	14:10	19.4	NA	1680	10.4	8.0	4.5	2.5	7.3	<5	5.5	2.2	220	360	360	83	37	NA
11/05/98	11:55	16.7	7.9	1640	11.2							1.8						280
11/12/98	9:30	14.4	7.9	1590	6.6							1.8						32
11/19/98	9:00	12.8	8.3	1820	8.1							2.1						32
11/24/98	15:15	15.6	8.2	2100	9.5	9.9						2.6						50
12/03/98	NA	14.4	NA	1990	8.5							2.3						56
12/09/98	17:00	10.6	NA	1770	7.7							1.9						43
12/17/98	9:20	9.4	7.8	2160	10.2							2.5						32
12/22/98	13:00	5.6	8.1	2170	10.7							2.4						28
12/31/98	12:00	12.2	7.5	2330	11.4	13						2.7						32
01/07/99	11:40	6.5	8.0	2340	9.2							2.8						27
01/14/99	13:30	7.2	9.1	2360	12.3							2.6						28
01/21/99	10:58	13.6	7.8	1950	8.3							2.2						72
01/28/99	12:10	8.3	8.0	2130	9.5	10	5.1	4.4	8.2	<5	NA	2.4	250	440	440	NA	NA	49
02/04/99	10:00	11.5	8.1	2380	12.4	9.8						2.6						48
02/11/99	10:55	9.3	8.0	2050	16.3							2.3						110
02/18/99	12:25	13.3	7.9	2460	20.0							2.9						85
02/25/99	10:45	14.7	8.0	2680	22.0	15						3.5						60
03/04/99	10:15	12.8	8.1	2670	21.8							3.2						56
03/11/99	11:10	13.3	8.0	3020	24.2							3.8						53
03/18/99	10:55	16.0	7.5	3240	29.7							4.0						59
03/25/99	11:30	16.1	7.2	2910	21.8	12						3.5						69
03/30/99	18:25	16.0	8.7	3350	26.4							4.0						82
04/08/99	12:20	10.7	8.3	3830	43.3							4.3						62
04/15/99	11:50	22.2	8.0	3330	33.4							3.9						61
04/22/99	12:20	19.0	6.8	3490	33.3							4.2						81
04/29/99	10:27	14.7	8.2	2690	21.5	13	20	13	28	<5	33	2.9	350	670	520	110	58	NA
05/06/99	10:25	21.1	8.3	2860	28.1							3.5						77
05/13/99	10:10	18.9	7.9	3970	45.5							6.1						68
05/20/99	11:05	21.4	7.5	2850	25.2							3.7						67
05/27/99	10:40	NA	NA	2730	22.9	16						3.3						91
06/03/99	8:50	16.4	7.0	2690	23.4							3.5						74
06/10/99	9:49	22.6	8.3	3570	32.1							4.9						86
06/17/99	10:43	25.0	8.2	4100	38.0							6.3						82
06/24/99	8:20	24.3	7.6	4220	40.0	18						6.1						110
07/01/99	12:30	29.6	8.0	3910	37.7							6.3						110
07/08/99	10:20	26.1	8.6	4100	43.0							6.3						110
07/15/99	13:35	29.1	7.9	3910	38.6							6.0						70
07/22/99	10:30	22.8	8.3	4160	38.9							6.8						48
07/29/99	8:20	21.5	7.7	4110	38.7	23	5.4	4.1	6.6	<5	<2	6.9	450	1200	880	220	83	57
08/05/99	10:10	24.6	8.2	4360	50.7							7.7						62
08/12/99	10:25	23.4	8.3	3700	29.3							6.2						68
08/19/99	9:15	23.1	7.9	3990	33.2							6.5						67
08/26/99	6:50	24.0	6.6	3790	42.4	21						5.7						72
09/02/99	11:40	23.4	7.5	3480	39.8							5.6						82
09/09/99	11:35	25.1	7.1	3050	28.2							4.9						60
09/16/99	10:30	22.7	7.9	2860	23.2							4.0						98
09/23/99	11:40	26.2	7.6	2730	17.6							3.6						60
09/30/99	10:10	22.0	7.7	1870	9.2	14						2.3						78
Count		52	49	53	53	13	4	4	4	4	3	53	4	4	4	3	3	47
Min		5.6	6.6	1410	6.6	8.0	4.5	2.5	6.6	<5	<2	1.8	220	360	360	83	37	27
Max		29.6	9.1	4360	50.7	23	20	13	28	<5	33	7.7	450	1200	880	220	83	280
Mean		17.8	7.9	2825	23.0	14	8.8	6.0	13	2.5	13	3.8	318	668	550	138	59	70
Geo Mean		16.7	7.9	2690	19.3	13	7.1	4.9	10	2.5	5.7	3.5	305	597	519	126	56	63
Median		18.6	8.0	2730	22.0	13	5.3	4.3	7.8	2.5	5.5	3.5	300	555	480	110	58	67

Mud Slough (north) at San Luis Drain (MER542)

Location: Latitude 37.264, Longitude 120.906. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140; located within Kesterson N.W.R.

WY 2000

Date	Time	Temp	pH	EC	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS
		C		umhos/cm	←			ug/L			→	←			mg/L			→
10/07/99	12:20	20.6	8.1	1660	8.1							2.0						
10/14/99	10:40	20.9	7.4	1550	4.6							1.9						
10/21/99	10:50	18.8	7.8	1320	3.7							1.4						
10/28/99	12:30	18.8	7.7	1540	4.3	7.4	2.6	2.3	6.1	<5	3.0	1.5	170	260	340	79	35	NA
11/04/99	11:25	18.5	8.0	1480	4.3							1.5						
11/11/99	10:30	16.4	NA	1680	7.0							1.8						
11/18/99	12:56	16.4	7.8	1780	6.5							2.1						
11/23/99	11:35	11.5	7.4	1870	5.1	10						2.0						
12/02/99	11:20	11.5	7.8	2010	6.6							2.3						
12/09/99	9:05	8.7	7.9	2220	10.7							2.3						
12/16/99	11:30	9.6	7.9	2250	9.2							2.2						
12/21/99	12:40	10.0	7.8	2250	13.3							2.4						
12/28/99	10:40	9.6	7.8	2320	13.5	9.8						2.3						
01/06/00	11:15	7.5	8.0	2070	6.7							2.0						
01/13/00	12:00	10.8	8.0	2180	6.5							2.2						
01/20/00	10:15	13.8	7.9	2420	14.3							2.6						
01/27/00	10:42	12.8	7.5	1990	9.2	9.0	4.4	3.4	7.1	<5	5.4	2.0	250	380	390	82	44	NA
02/03/00	10:55	13.8	8.1	2330	10.1							2.6						
02/10/00	12:05	14.9	7.0	2710	19.6							3.2						
02/17/00	10:20	13.1	7.9	1930	10.1							2.2						
02/24/00	11:45	11.0	7.9	1910	12.4	8.7						2.2						
03/02/00	10:00	12.7	7.9	2520	14.6							3.0						
03/09/00	11:45	12.7	8.0	3000	23.2							3.4						
03/15/00	17:25	19.1	NA	2600	18.9							3.1						
03/23/00	8:00	14.9	7.4	3380	30.9							4.2						
03/30/00	10:05	15.9	8.3	3880	46.6	19	6.8	4.1	6.7	<5	<2	4.7						
04/06/00	12:20	20.4	8.3	3350	27.9		5.2	4.0	6.8	<5	<2	4.1						
04/13/00	11:10	21.1	8.2	3820	31.1		5.6	6.1	8.2	<5	4.2	5.0						
04/20/00	10:50	18.4	7.9	3360	38.6		8.2	4.9	8.6	<5	5.1	4.6						
04/27/00	11:20	22.2	NA	4530	53.5	24	7.2	3.7	5.7	<5	<2	6.1	600	1500	1000	250	96	NA
05/04/00	10:40	22.7	8.2	4910	66.0		7.5	3.3	<5	<5	<2	7.4						
05/11/00	11:14	19.3	8.2	3160	30.2		3.8	3.4	<5	<5	3.5	4.4						
05/18/00	10:05	20.3	8.1	2290	13.7		3.3	4.3	6.7	<5	4.8	2.9						
05/25/00	8:29	21.1	8.2	3220	20.6	19	5.9	4.0	7.7	<5	5.3	4.8						
06/01/00	7:25	19.3	8.0	2800	23.4		4.0	3.0	6.1	<5	7.7	3.6						
06/08/00	11:00	21.0	8.2	3490	31.5		5.5	4.0	6.6	<5	2.2	5.4						
06/15/00	12:05	28.8	8.3	3670	30.2		6.7	4.5	6.8	<5	<2	5.8						
06/22/00	10:30	29.3	8.3	3700	34.7		7.7	5.1	8.8	<5	4.7	7.7						
06/29/00	11:45	28.5	7.2	3990	31.6	23	4.5	3.4	<5	<5	<2	6.9						
07/06/00	13:05	24.5	7.1	3790	29.9							6.2						
07/13/00	9:55	24.6	8.3	3680	34.7							5.8						
07/20/00	11:20	25.9	8.4	3520	31.7							6.0						
07/27/00	14:25	26.4	8.4	3690	40.2	17	4.9	3.4	5.9	<5	NA	5.9	370	970	770	190	72	NA
08/03/00	10:10	28.5	8.1	3760	42.6							6.3						
08/10/00	8:30	22.9	7.6	3390	29.8							5.8						
08/17/00	11:50	26.7	8.2	3180	20.3							5.6						
08/24/00	10:10	23.3	8.3	3110	25.1							5.2						
08/31/00	12:20	24.1	8.3	3870	45.1	23	3.9	2.8	6.1	<5	<2	6.2	420	1200	870	220	79	NA
09/07/00	10:45	21.2	7.9	3180	34.7							5.2						
09/14/00	11:10	24.3	7.6	2120	20.7							3.1						
09/21/00	10:20	22.9	7.1	2560	23.0							3.9						
09/28/00	14:00	25.3	7.8	2240	14.7	17	4.2	3.3	7.4	<5	5.5	3.3	240	580	490	120	47	
Count		52	49	52	52	12	19	19	19	19	18	52	6	6	6	6	6	0
Min		7.5	7.0	1320	3.7	7.4	2.6	2.3	<5	<5	<2	1.4	170	260	340	79	35	
Max		29.3	8.4	4910	66.0	24	8.2	6.1	8									

Salt Slough at Lander Avenue (State Highway 165) (MER531)

Location: Latitude 37.248, Longitude 120.852. In NW 1/4, SE 1/4, Sec.10, T.8S, R.10E. 13 miles north of Los Ba
5 miles south of Highway 140.

WY 1999

Date	Time	Temp		EC umhos/cm	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS
		C	pH															
10/01/98	8:10	20.6	7.5	832	0.9							0.38						
10/08/98	8:35	19.4	7.4	871	0.9							0.45						
10/15/98	8:45	17.8	7.7	982	0.9							0.53						
10/22/98	9:05	17.2	7.5	1200	1.1							0.60						
10/29/98	13:15	18.3	NA	1030	1.0	8.0	2.7	2.9	5.2	<5	11	0.57	142	144	220	47	24	
11/05/98	10:00	15.6	7.5	1110	1.1							0.61						73
11/12/98	8:45	11.7	8.0	1150	1.0							0.60						74
11/18/98	16:50	15.0	7.6	1110	0.9							0.63						97
11/24/98	13:45	16.1	8.2	1330	0.9							0.75						54
12/03/98	9:35	14.4	7.8	1210	0.6							0.86						71
12/09/98	12:45	12.2	NA	1480	0.6							0.97						48
12/17/98	7:55	9.4	7.5	1640	0.5							0.96						45
12/22/98	12:18	6.7	7.7	1580	<0.4							0.96						47
12/30/98	15:00	10.6	7.3	1610	0.5							0.97						34
01/07/99	10:43	7.0	7.6	1440	0.5							0.88						39
01/14/99	11:20	6.1	7.9	1210	0.7							0.69						39
01/21/99	9:55	12.8	7.5	1210	1.1							0.80						140
01/27/99	11:52	8.3	7.9	1290	0.9	7.4	2.2	5	<5	<5	NA	0.83	170	210	280	NA	NA	60
02/04/99	9:15	10.3	7.8	1460	0.8							0.85						69
02/11/99	9:20	8.5	7.3	1300	1.2							0.79						88
02/18/99	11:40	13.5	7.6	1400	0.7							0.78						103
02/25/99	9:10	12.9	7.6	1140	0.8							0.65						71
03/04/99	9:41	12.7	7.4	1370	0.9							0.69						92
03/11/99	9:30	12.2	7.6	1610	0.9							0.98						82
03/18/99	9:43	14.3	8.4	1420	1.3							1.1						101
03/25/99	9:35	15.9	6.9	1600	1.1							1.2						88
04/08/99	10:40	10.8	7.7	1850	1.5							1.4						96
04/15/99	10:20	19.9	7.4	1700	0.8							0.87						125
04/22/99	9:00	17.1	7.2	1790	1.3							1.0						100
04/29/99	9:10	12.8	7.5	1490	0.9	9.5	4.5	5.6	7.7	<5	19	0.61	230	210	290	60	33	NA
05/06/99	8:30	18.8	8.1	1130	0.6							0.49						130
05/13/99	9:19	18.6	7.8	1290	0.9							0.57						140
05/20/99	8:40	17.9	7.1	1370	0.8							0.63						120
05/27/99	9:40	22.7	7.5	1440	0.7							0.56						120
06/03/99	10:57	17.0	6.7	1350	0.5							0.56						140
06/10/99	8:45	20.0	7.8	1180	0.8							0.51						160
06/17/99	9:22	22.9	7.9	1450	0.9							0.67						120
06/24/99	9:15	23.9	7.0	1110	0.9							0.48						200
07/01/99	11:05	27.8	7.7	1270	0.8							0.52						170
07/08/99	9:30	23.1	8.5	938	0.8							0.42						180
07/15/99	12:05	26.2	8.7	864	0.9							0.48						210
07/22/99	9:30	22.2	7.7	1120	0.6							0.64						140
07/29/99	9:45	22.1	7.5	885	0.8	7.6	7.6	9.4	12	<5	26	0.59	110	120	200	46	22	230
08/05/99	9:24	23.4	8.0	1010	0.8							0.53						170
08/12/99	9:01	21.7	7.7	1070	0.7							0.46						140
08/19/99	8:18	21.3	7.2	868	0.8							0.54						160
08/26/99	7:55	24.3	7.3	872	0.7							0.36						180
09/02/99	10:45	21.4	7.2	1240	0.7							0.49						93
09/09/99	9:15	22.6	7.3	912	1.0							0.43						120
09/16/99	9:25	20.9	7.2	978	1.1							0.49						150
09/23/99	9:50	23.0	7.1	1100	0.6							0.49						120
09/30/99	9:15	20.9	7.3	1030	0.8							0.46						200
Count		52	50	52	52	4	4	4	4	4	3	52	4	4	4	3	3	46
Min		6.1	6.7	832	<0.4	7.4	2.2	2.9	<5	<5	11	0.36	110	120	200	46	22	34
Max		27.8	8.7	1850	1.5	9.5	7.6	9.4	12	<5	26	1.4	230	210	290	60	33	230
Mean		17.0	7.6	1250	0.8	8.1	4.3	5.7	6.9	2.5	19	0.68	163	171	248	51	26	114
Geo Mean		16.0	7.6	1220	0.8	8.1	3.8	5.3	5.9	2.5	18	0.65	157	166	244	51	26	102
Median		17.5	7.5	1210	0.8	7.8	3.6	5.3	6.5	2.5	19	0.61	156	177	250	47	24	112

Salt Slough at Lander Avenue (State Highway 165) (MER531)

Location: Latitude 37.248, Longitude 120.852. In NW 1/4, SE 1/4, Sec.10, T.8S, R.10E. 13 miles north of Los Banos
5 miles south of Highway 140.

WY 2000

Date	Time	Temp		EC umhos/cm	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS
		C	pH															
10/07/99	11:05	18.8	8.4	1030	0.8							0.50						
10/14/99	9:45	19.8	7.8	1180	0.8							0.64						
10/21/99	9:45	16.2	8.1	1100	0.8							0.59						
10/28/99	11:30	17.8	7.7	1320	0.4	7.2	4.3	4.8	7	<5	13	0.65	180	160	270	56	31	NA
11/04/99	9:45	25.7	7.9	1350	0.8							0.74						
11/11/99	9:05	14.9	NA	1190	1.0							0.74						
11/18/99	11:20	15.0	7.7	1470	0.8							0.88						
11/23/99	10:35	10.3	7.6	1460	0.5							0.75						
12/02/99	9:40	10.9	7.6	1600	0.6							0.93						
12/09/99	8:10	9.5	7.7	1730	0.9							0.99						
12/16/99	10:15	7.7	7.6	1840	1.1							0.98						
12/21/99	11:50	9.8	7.7	2000	0.8							1.1						
12/28/99	9:40	8.2	7.7	2330	0.5							1.2						
01/06/00	10:00	7.2	7.7	2170	0.5							1.2						
01/13/00	10:12	10.3	7.9	2270	<0.4							1.3						
01/20/00	9:30	13.9	7.7	2140	0.5							1.3						
01/27/00	9:45	12.5	7.4	1950	1.0	9.9	4.4	4.8	7.1	<5	14	1.4	310	370	380	79	44	NA
02/03/00	9:35	12.1	7.6	2370	0.7							1.7						
02/10/00	10:10	14.7	7.4	2000	1.1							1.4						
02/17/00	9:20	12.5	7.4	1750	1.1							1.3						
02/24/00	13:10	11.5	7.4	1690	1.6							1.2						
03/02/00	9:10	13.0	7.4	1670	1.6							1.1						
03/09/00	13:10	13.9	7.6	1600	1.1							1.1						
03/15/00	16:35	18.8	NA	1690	1.7							1.1						
03/23/00	9:33	15.5	7.4	1510	1.1							1.2						
03/30/00	8:55	15.4	7.9	1310	0.5		3.1	4.5	6.1	<5	11	0.92						
04/06/00	11:30	18.1	7.4	1380	1.0		3.8	4.7	6.0	<5	12	0.65						
04/13/00	8:50	19.2	7.6	1790	0.7		1.9	5.1	5.1	<5	8.8	0.86						
04/20/00	10:01	16.8	7.9	1030	1.0		2.3	4.6	5.5	<5	10	0.59						
04/27/00	9:37	20.2	NA	1650	0.9	9.6	2.7	4.2	5.2	<5	9.4	0.69	240	230	340	74	39	NA
05/04/00	8:45	20.4	7.6	1320	1.4		3.3	5.0	6.1	<5	11	0.66						
05/11/00	9:00	16.4	7.6	1210	1.3		3.2	5.2	6.1	<5	12	0.57						
05/18/00	9:08	19.1	7.9	1580	0.7		2.7	5.4	6.1	<5	11	0.75						
05/25/00	10:38	20.9	7.5	1540	1.0	9.2	3.7	4.6	6.6	<5	11	0.76						
06/01/00	8:10	19.3	7.6	1220	0.8		4.1	4.7	7.2	<5	17	0.54						
06/08/00	8:56	20.3	7.7	1230	1.4		4.1	6.0	6.9	<5	15	0.52						
06/15/00	10:45	27.8	7.7	1100	1.2		4.0	7.2	7.9	<5	15	0.51						
06/22/00	8:45	26.0	8.1	1060	1.1		3.1	6.6	7.4	<5	18	0.51						
06/29/00	12:30	28.0	7.9	1170	0.7	9.6	3.4	5.2	6.7	<5	13	0.72						
07/06/00	9:55	21.8	7.5	874	1.1							0.41						
07/13/00	9:11	22.9	7.9	976	0.9							0.48						
07/20/00	8:50	22.7	8.0	918	0.9							0.64						
07/27/00	13:40	24.9	8.7	931	1.2	4.5	5.1	6.4	8.3	<5	NA	0.48	120	110	210	47	23	NA
08/03/00	8:35	26.2	7.8	916	0.8							0.58						
08/10/00	9:10	22.4	8.1	927	1.1							0.46						
08/17/00	9:45	23.8	7.9	955	0.5							0.42						
08/24/00	9:35	21.9	8.1	1020	0.7							0.58						
08/31/00	10:56	21.7	8.1	1060	<0.4	7.5	3.9	4.7	6.9	<5	12	0.52	160	140	120	53	26	NA
09/07/00	10:00	20.2	7.8	1280	<0.4							0.57						
09/14/00	9:35	22.9	7.9	1140	<0.4							0.49						
09/21/00	9:40	21.5	7.7	1320	<0.4							0.60						
09/28/00	12:40	21.4	8.0	1300	0.9	9.5	3.5	3.4	5.2	<5	8.0	0.58	92	78	180	34	23	NA
Count		52	49	52	52	8	19	19	19	19	18	52	6	6	6	6	6	0
Min		7.2	7.4	874	<0.4	4.5	1.9	3.4	5.1	<5	8.0	0.41	92	78	120	34	23	
Max		28.0	8.7	2370	1.7	9.9	5.1	7.2	8.3	<5	18	1.7	310	370	380	79	44	
Mean		17.7	7.8	1430	0.8	8.4	3.5	5.1	6.5	2.5	12	0.81	184	181	250	57	31	
Geo Mean		16.8	7.8	1380	0.8	8.1	3.4	5.0	6.4	2.5	12	0.75	169	159	233	55	30	
Median		18.8	7.7	1320	0.9	9.3	3.5	4.8	6.6	2.5	12	0.71	170	150	240	54.5	28.5	

San Luis Drain @ Terminus (MER535)

Location: Latitude 37.241, Longitude 120.882. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140, located within Kesterson N.W.R.

WY 1999

Date	Time	Temp C	pH	EC umhos/cm	Se	Diss. Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS
ug/L													mg/L						
10/01/98	8:40	20.6	7.6	3210	21.6	22.1							4.6						40
10/08/98	9:25	21.7	8.5	4500	45.3	44.1							7.0						61
10/15/98	9:15	18.9	8.1	5280	50.0	49.6							7.9						84
10/22/98	10:05	20.0	8.2	5200	49.6	49.0							7.7						43
10/29/98	13:40	19.4	NA	5120	55.4	55.6	36	5.2	3.3	5.4	<5	<2	9.2	630	1700	1100	290	100	54
11/05/98	11:30	16.7	8.0	5080	68.0	65.0							6.8						46
11/12/98	9:10	14.4	7.9	4740	46.0	46.4							6.9						30
11/19/98	7:25	11.1	8.1	5020	49.5	50.2							7.3						59
11/24/98	14:10	16.1	8.1	5850	53.8	53.9	35						9.3						24
12/03/98	10:00	14.4	8.3	5060	48.6	45.0							8.2						45
12/09/98	17:25	11.1	NA	5120	93.2	92.6							7.3						28
12/17/98	8:25	9.4	7.8	5370	63.0	69.8							8.6						NA
12/22/98	12:40	7.8	8.0	5300	68.8	67.6							8.2						18
12/31/98	11:15	10.0	7.7	5700	110	112	35						8.1						28
01/07/99	11:10	7.5	8.1	4820	49.2	52.1							7.7						17
01/14/99	11:55	7.2	8.5	4690	58.1	59.9							7.3						13
01/21/99	10:28	14.4	7.8	4720	53.4	54.1							7.2						26
01/28/99	11:20	8.1	7.9	4460	50.4	49.0	28	11	3.7	<5	<5	NA	7.0	530	1300	1050	280	84	21
02/04/99	9:40	11.8	8.0	3990	54.1	56.6	19						5.9						30
02/11/99	9:55	10.3	7.8	4370	71.8	68.7							6.0						47
02/18/99	12:00	13.6	7.6	4570	68.5	69.5							6.1						53
02/25/99	9:45	15.2	7.9	4780	69.6	68.1	28						6.9						68
03/04/99	10:05	14.0	7.6	5400	80.7	79.3							7.6						49
03/11/99	9:55	13.4	7.7	5210	87.3	80.2							7.9						42
03/18/99	10:05	15.5	8.1	5130	79.6	80.6							7.4						34
03/25/99	10:10	15.9	7.8	5390	82.7	81.1	23						7.9						27
03/30/99	17:35	14.4	8.5	5670	87.0	88.4							8.0						27
04/08/99	11:00	10.6	7.8	5920	122	124							7.6						29
04/15/99	11:05	20.9	7.4	5480	90.3	93.4							7.2						42
04/22/99	10:20	18.0	7.8	5640	91.8	90.0							8.0						49
04/29/99	9:37	13.9	7.4	5910	98.0	98.4	31	8.5	3.1	<5	<5	<2	8.2	720	2000	1200	300	110	30
05/06/99	9:19	20.2	7.5	4360	53.3	52.1							6.3						46
05/13/99	9:55	19.5	7.5	4260	59.7	58.3							6.8						36
05/20/99	9:15	20.8	6.5	4630	58.0	60.1							7.0						78
05/27/99	10:15	NA	NA	4670	54.1	53.9	23						6.7						80
06/03/99	9:15	17.2	7.4	4610	54.3	54.0							7.0						65
06/10/99	9:20	21.5	8.1	5090	60.0	59.3							7.3						83
06/17/99	10:23	24.7	7.9	4910	54.4	55.8							7.9						51
06/24/99	8:40	24.4	7.8	5040	62.0	57.6	23						7.6						73
07/01/99	12:00	30.7	6.9	4800	47.7	49.4							8.1						78
07/08/99	9:50	27.4	8.0	4200	45.9	43.4							6.7						120
07/15/99	13:12	28.4	8.0	4200	40.5	38.6							7.3						56
07/22/99	9:50	22.9	8.3	4030	36.1	35.8							6.5						31
07/29/99	9:00	21.5	8.1	4370	47.7	48.9	26	3.9	4.1	4.6	<5	2.3	7.3	500	1300	950	240	86	38
08/05/99	9:45	24.3	8.3	3870	42.6	40.5							7.0						50
08/12/99	9:30	22.9	8.3	3720	31.4	29.5							6.2						58
08/19/99	8:30	23.2	8.1	3960	32.2	30.8							6.6						69
08/26/99	7:25	24.0	7.6	3590	42.1	38.3	20						5.6						66
09/02/99	11:10	21.8	6.2	3780	41.5	41.7							6.4						86
09/09/99	10:55	24.6	8.0	3750	36.3	36.3							6.1						NA
09/16/99	10:00	22.0	7.0	4210	34.6	36.7							6.3						79
09/23/99	10:40	26.2	7.9	4700	38.9	39.1							6.7						66
09/30/99	9:50	22.5	7.5	4540	61.1	60.9	33						6.4						54
Count		52	50	53	53	53	13	4	4	4	4	3	53	4	4	4	4	4	51
Min		7.2	6.2	3210	21.6	22.1	19	3.9	3.1	<5	<5	<2	4.6	500	1300	950	240	84	13
Max		30.7	8.5	5920	122	124	36	11	4.1	5.4	<5	2.3	9.3	720	2000	1200	300	110	120
Mean		17.8	7.8	4755	59.5	59.2	28	7.2	3.6	3.8	2.5	1.4	7.2	595	1575	1075	278	95	50
Geo Mean		16.8	7.8	4711	56.1	55.8	27	6.6	3.5	3.5	2.5	1.3	7.1	589	1548	1071	277	94	45
Median		18.4	7.9	4740	54.1	54.1	28	6.9	3.5	3.6	2.5	1.0	7.2	580	1500	1075	285	93	47

San Luis Drain @ Terminus (MER535)

Location: Latitude 37.241, Longitude 120.882. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 m southeast of Highway 140, located within Kesterson N.W.R.

WY 2000

Date	Time	Temp C	pH	EC umhos/cm	Se	Mo	Cr	Cu	Ni	Pb	Zn	B	Cl	SO4	HDNS	Ca	Mg	TSS	TDS
ug/L												mg/L							
10/07/99	11:35	20.1	7.4	3990	27.1							6.2						74	
10/14/99	10:15	21.6	7.8	4730	25.7							8.1						49	
10/21/99	10:25	18.8	7.8	4470	29.0							6.8						46	
10/28/99	12:10	18.8	8.0	4580	33.5	36	4.8	3.6	6.9	<5	4.7	6.5	520	1400	1100	310	89	58	
11/04/99	11:05	20.2	7.7	4710	34.3							7.1						46	
11/11/99	10:00	16.4	NA	4030	34.6							6.4						45	
11/18/99	12:00	16.8	7.9	4260	32.9							7.1						46	
11/23/99	11:05	12.0	7.9	4540	39.8	39						7.4						36	
12/02/99	10:55	13.5	7.9	4060	40.9							6.8						54	
12/09/99	8:38	9.1	7.9	4540	67.1							7.1						50	
12/16/99	10:50	8.6	7.6	4410	51.7							6.8						50	
12/21/99	12:15	9.7	7.4	4400	49.1							7.0						48	
12/28/99	10:15	9.2	6.9	4880	74.2	27						7.1						53	
01/06/00	10:45	7.5	7.3	4560	58.9							7.1						48	
01/13/00	10:45	10.0	7.9	4480	52.5							6.9						72	
01/20/00	9:55	13.5	7.5	4750	74.3							7.4						89	
01/27/00	11:28	13.3	7.7	4610	70.3	26	NA	NA	NA	NA	NA	6.6	540	1400	1100	290	87	48	3500
02/03/00	10:10	13.4	7.6	4860	59.4							7.8						72	
02/10/00	10:50	14.7	7.8	4690	64.6							7.2						81	3500
02/17/00	10:45	13.4	7.9	4250	55.3							6.2						72	3100
02/24/00	10:58	11.7	7.6	4660	69.6	26						7.2						57	3400
03/02/00	9:35	13.0	7.7	4980	80.8							7.6						74	3800
03/09/00	10:35	12.7	7.8	4990	78.9							7.0						50	3800
03/15/00	16:55	18.9	NA	5450	96.0							8.2						66	4100
03/23/00	8:29	15.1	8.0	5600	94.6							8.3						37	4300
03/30/00	9:40	16.9	8.1	5540	99.3	32	8.4	2.4	<5	<5	<2	8.2						NA	4200
04/06/00	12:00	20.2	8.4	4870	74.3		7.4	3.2	<5	<5	<2	7.3						59	3600
04/13/00	9:30	20.5	8.3	4700	60.8		5.2	4.6	<5	<5	2.1	7.5						56	3500
04/20/00	10:20	17.7	7.7	5010	82.1		10	4.3	5.7	<5	<2	7.6						90	3900
04/27/00	10:45	23.1	NA	5460	75.9	29	8.5	3.8	<5	<5	<2	8.4	610	1900	1400	350	120	71	4100
05/04/00	10:10	22.1	8.3	5400	94.8		6.5	2.7	<5	<5	<2	8.4						NA	4100
05/11/00	9:30	18.5	8.2	4000	47.5		4.2	3.1	<5	<5	<2	6.3						42	3000
05/18/00	9:35	19.9	8.2	3810	34.0		3.9	4.1	<5	<5	4.0	6.2						62	2800
05/25/00	9:06	21.4	8.2	4690	48.3	24	2.7	2.5	<5	<5	<2	8.1						31	3500
06/01/00	7:45	20.3	8.1	4300	49.8		6.0	3.8	6.2	<5	3.2	6.5						67	3200
06/08/00	9:50	20.5	8.2	4260	43.4		5.3	3.9	5.6	<5	<2	7.4						59	3200
06/15/00	11:30	29.2	8.4	4000	37.5		7.9	4.1	<5	<5	<2	6.8						54	3000
06/22/00	9:15	27.9	8.1	4610	47.1		5.6	3.5	<5	<5	<2	5.8						64	3500
06/29/00	12:00	28.3	8.3	4180	38.8	27	6.2	4.0	<5	<5	<2	7.5						70	3000
07/06/00	10:45	23.3	8.2	4220	36.2							7.2						80	3100
07/13/00	9:34	23.7	8.0	3910	40.6							6.5						30	NA
07/20/00	11:00	34.3	7.3	3810	34.9							6.7						64	2800
07/27/00	14:10	26.7	8.3	4110	48.4	23	3.4	2.6	<5	<5	NA	6.5	440	1200	870	220	78	37	3000
08/03/00	9:05	27.4	7.6	3760	39.4							6.5						52	2800
08/10/00	8:45	23.2	8.1	3760	35.4							6.5						80	2700
08/17/00	10:25	26.6	8.1	3700	27.4							6.7						36	2700
08/24/00	9:55	23.1	8.0	3480	30.1							6.0						52	430
08/31/00	11:40	23.4	7.7	4010	45.5	22	5.1	3.2	6.8	<5	2.7	6.5	470	1200	910	230	80	71	3000
09/07/00	10:30	21.4	7.3	3690	46.4							6.0						78	2700
09/14/00	10:10	23.7	8.0	3140	33.3							5.0						53	2200
09/21/00	10:05	23.3	5.5	4790	53.2							8.3						64	3700
09/28/00	13:20	24.9	6.2	4130	35.2	32	3.2	3.7	5.9	<5	<2	7.4	440	1400	970	250	84	33	3200
Count		52	49	52	52	12	18	18	18	18	17	52	6	6	6	6	6	50	34
Min		7.5	5.5	3140	25.7	22	2.7	2.4	<5	<5	<2	5.0	440	1200	870	220	78	30	430
Max		34.3	8.4	5600	99.3	39	10	4.6	6.9	<5	4.7	8.4	610	1900	1400	350	120	90	4300
Mean		18.9	7.8	4439	52.6	29	5.8	3.5	3.7	2.5	1.7	7.0	503	1417	1058	275	90	58	3248
Geo Mean		17.9	7.8	4406	49.1	28	5.5	3.4	3.4	2.5	1.4	7.0	500	1399	1045	271	89	55	3102
Median		20.0	7.9	4475	47.9	27	5.5	3.7	2.5	2.5	1.0	7.1	495	1400	1035	270	86	55	3200

Inflow at San Luis Drain: Check 17 (MER562)

Location: Latitude 36.966, Longitude 120.671. In Sec.21, T.11S, R.12E. West of South Dos Palos, downstream of point where the Grasslands Bypass empties into the San Luis Drain.

WY 1999						
Date	Time	EC umhos/cm	Se ug/L	Diss Se ug/L	Mo	TSS mg/L
10/07/98	11:00	4970	55.6	57.3	7.7	26
10/14/98	11:40	5600	66.2	64.8	9.3	NA
10/21/98	11:30	6570	104	105	9.5	35
10/28/98	11:00	4740	48.6	49.2	7.4	67
11/04/98	11:20	5040	55.2	55.8	7.8	NA
11/11/98	11:10	5660	72.4	73.2	8.3	37
11/18/98	11:15	6680	63.9	65.7	11	26
11/24/98	11:00	5790	61.8	62.7	9.5	21
12/02/98	11:00	5250	94.6	78.5	7.9	NA
12/09/98	11:00	5420	50.9	52.7	9.2	16
12/16/98	11:40	5590	88.7	89.7	9.5	30
12/22/98	11:00	5680	102	95.9	9.0	20
12/30/98	11:15	4870	46.0	49.0	7.9	9
01/06/99	11:00	4890	58.2	56.0	8.4	43
01/13/99	10:35	5190	90.3	88.6	8.2	39
01/20/99	11:00	5080	78.4	79.7	7.9	87
01/27/99	11:00	5090	61.2	60.3	8.3	48
02/03/99	11:00	4940	79.7	82.2	7.3	NA
02/10/99	11:20	4110	62.0	60.9	5.4	210
02/17/99	10:55	4780	70.2	70.6	6.7	140
02/24/99	11:10	5190	79.2	79.1	7.9	98
03/03/99	11:15	5110	87.0	81.2	7.8	120
03/10/99	10:35	5420	88.8	80.9	8.1	56
03/17/99	10:45	5320	96.3	92.5	7.4	58
03/24/99	11:00	5780	96.1	88.2	7.5	32
03/31/99	11:15	5780	91.7	90.0	8.0	20
04/07/99	10:40	5460	92.9	86.8	6.5	30
04/14/99	11:00	5740	98.5	94.3	8.1	NA
04/21/99	10:40	5150	81.4	80.2	7.4	27
04/28/99	11:00	5270	75.3	74.6	23 7.9	72
05/05/99	11:00	4520	51.0	50.9	6.7	35
05/12/99	11:00	4880	64.6	60.3	7.9	41
05/19/99	11:10	4640	51.4	51.7	7.2	210
05/26/99	11:20	4840	48.9	51.2	24 7.6	100
06/02/99	11:00	5210	51.3	50.9	8.2	110
06/09/99	11:30	4940	49.8	49.8	7.4	170
06/16/99	10:20	5210	56.0	55.4	7.8	180
06/23/99	10:45	5040	47.4	48.4	20 7.9	180
06/30/99	10:30	4900	48.7	48.0	7.9	270
07/07/99	11:10	4510	47.8	47.2	7.1	150
07/14/99	9:10	4640	41.2	42.3	7.7	130
07/21/99	10:45	4480	42.9	39.9	7.3	150
07/28/99	11:00	4250	40.3	40.8	25 7.1	150
08/04/99	10:50	4550	47.3	43.9	7.0	200
08/11/99	11:00	4180	39.3	39.0	6.9	79
08/18/99	10:42	4410	43.7	45.2	7.3	NA
08/25/99	11:00	3870	51.6	49.3	6.0	220
09/01/99	10:45	4040	45.7	48.0	6.6	120
09/08/99	10:47	4110	46.7	46.1	6.6	61
09/15/99	11:00	3510	36.9	37.8	5.5	32
09/22/99	10:40	5200	66.5	68.3	7.7	46
09/29/99	10:45	5840	72.9	70.9	9.2	87
Count		52	52	52	4	52 46
Min		3510	36.9	37.8	20	5.4 9
Max		6680	104	105	25	11 270
Mean		5037	65.2	64.1	23	7.8 89
Geo Mean		5000	62.4	61.6	23	7.7 65
Median		5060	61.5	60.3	24	7.8 64

WY 2000						
Date	Time	EC umhos/cm	Se ug/L	Diss Se ug/L	Mo	TSS mg/L
10/06/99	10:50	5760	48.6			10.0 82
10/13/99	10:50	4720	54.6			7.2 90
10/20/99	11:06	5610	84.3			8.3 62
10/27/99	10:01	5510	71.4			8.1 57
11/03/99	10:45	4900	62.2			7.7 72
11/11/99	11:20	4140	49.3			6.7 73
11/17/99	10:35	5080	59.2			8.7 74
11/22/99	11:30	4650	50.0		26	7.4 27
12/01/99	10:45	4290	54.6			7.0 61
12/08/99	10:45	4530	47.2			7.4 21
12/15/99	10:30	5170	95.5			7.3 13
12/20/99	10:46	5290	98.7			8.1 18
12/27/99	11:25	5260	103			8.2 19
01/05/00	10:30	4940	82.3			8.1 NA
01/12/00	10:20	5270	96.7			8.6 54
01/19/00	10:45	3330	67.3			4.5 130
01/26/00	10:40	4140	49.3		19	6.0 72
02/02/00	11:00	5170	74.4			8.4 80
02/09/00	10:20	4250	NA			NA 290
02/16/00	11:00	4870	NA			NA 320
02/23/00	11:20	4730	NA			NA 310
03/01/00	11:20	4750	75.5			6.9 290
03/08/00	11:15	5160	75.8			7.6 160
03/15/00	10:31	5670	NA			NA 90
03/22/00	10:40	5530	NA			NA 50
03/29/00	10:00	5290	NA			NA NA
04/05/00	10:25	4700	NA			NA 82
04/12/00	10:20	5640	NA			NA 82
04/19/00	10:40	4060	NA			NA 250
04/26/00	10:40	5420	NA			7.4 120
05/03/00	10:40	5380	NA			NA 130
05/10/00	10:40	4290	NA			NA 150
05/17/00	10:45	4500	NA			NA 85
05/24/00	11:10	4310	NA			NA 240
05/31/00	11:20	4320	NA			NA 220
06/07/00	10:40	4170	NA			NA 210
06/14/00	10:20	4330	NA			NA 97
06/21/00	10:40	4140	NA			NA 100
06/28/00	10:30	4580	NA			7.8 NA
07/05/00	10:50	4260	40.5			7.2 NA
07/12/00	10:54	4020	NA			NA 120
07/19/00	10:16	4180	NA			NA 84
07/26/00	10:40	3960	NA			NA 92
08/02/00	10:40	3740	NA			NA 190
08/09/00	10:25	3740	NA			NA 90
08/16/00	10:25	3650	NA			NA NA
08/23/00	10:40	3690	NA			NA 100
08/30/00	10:30	4080	NA			NA 100
09/06/00	10:25	3700	NA			NA 76
09/13/00	10:45	5020	NA			NA 40
09/20/00	10:58	4350	NA			NA 42
09/27/00	10:40	4890	NA			NA 78
Count		52	21	0	2	23 47
Min		3330	40.5		19	4.5 13
Max		5760	103		26	10 320
Mean		4640	68.6		22	7.6 113
Geo Mean		4596	66.1		22	7.5 88
Median		4615	67.3		22	7.6 85

APPENDIX B

Water Quality Data for Automated Samplers: Water Years 1999 and 20

Map Index	RWQCB Site ID	Site Name	Page
SLD-2	MER535S	San Luis Drain @ Terminus	
		Water Year 1999	74
		Water Year 2000	75
SLD-1	MER562S	Inflow to San Luis Drain @ Check 17	
		Water Year 1999	76
		Water Year 2000	77

Legend of Abbreviations

B	Boron
EC	Electrical Conductivity
NA	data Not Available
Se	Selenium

San Luis Drain @ Terminus (MER535S)

WY 1999

Location: Latitude 37.241, Longitude 120.882. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140, located within Kesterson N.W.R.

AUTOSAMPLER DATA: 24 hour composite samples

DATA SUMMARY

EC Se B				EC Se B				EC Se B				EC Se B				EC Se B				EC Se B				EC Se B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/01/98	3300	21.1	5.2	12/01/98	5320	48.6	8.1	02/01/99	4790	64.2	7.0	04/01/99	5180	96.8	7.5	06/01/99	5020	51.2	7.5	08/01/99	4600	47.6	7.7	<div><div>Count</div><div>Min</div><div>Max</div><div>Mean</div><div>Geo Mean</div><div>Median</div></div> <div><div>364</div><div>3300</div><div>6140</div><div>4784</div><div>4752</div><div>4765</div></div> <div><div>363</div><div>21.1</div><div>121</div><div>59.1</div><div>56.3</div><div>54.3</div></div> <div><div>364</div><div>5.2</div><div>9.5</div><div>7.4</div><div>7.3</div><div>7.4</div></div> <tr><td>10/02/98</td><td>3430</td><td>21.4</td><td>5.2</td><td>12/02/98</td><td>5230</td><td>47.3</td><td>8.1</td><td>02/02/99</td><td>4620</td><td>62.7</td><td>6.3</td><td>04/02/99</td><td>5060</td><td>90.2</td><td>7.3</td><td>06/02/99</td><td>4920</td><td>60.2</td><td>7.2</td><td>08/02/99</td><td>4720</td><td>47.4</td><td>8.2</td><td>10/02/99</td><td>4500</td><td>45.0</td><td>7.5</td><td>12/02/99</td><td>4600</td><td>46.0</td><td>7.5</td></tr> <tr><td>10/03/98</td><td>3470</td><td>30.8</td><td>5.7</td><td>12/03/98</td><td>5240</td><td>49.6</td><td>7.9</td><td>02/03/99</td><td>4160</td><td>46.7</td><td>5.9</td><td>04/03/99</td><td>5310</td><td>97.6</td><td>7.6</td><td>06/03/99</td><td>4480</td><td>52.3</td><td>6.9</td><td>08/03/99</td><td>4850</td><td>51.4</td><td>8.5</td><td>10/03/99</td><td>4850</td><td>51.4</td><td>8.5</td><td>12/03/99</td><td>4850</td><td>51.4</td><td>8.5</td></tr> <tr><td>10/04/98</td><td>3850</td><td>35.4</td><td>5.8</td><td>12/04/98</td><td>5300</td><td>64.8</td><td>8.3</td><td>02/04/99</td><td>4170</td><td>52.3</td><td>5.9</td><td>04/04/99</td><td>5330</td><td>94.6</td><td>7.8</td><td>06/04/99</td><td>4780</td><td>54.9</td><td>7.8</td><td>08/04/99</td><td>4550</td><td>51.3</td><td>8.2</td><td>10/04/99</td><td>4550</td><td>51.3</td><td>8.2</td><td>12/04/99</td><td>4550</td><td>51.3</td><td>8.2</td></tr> <tr><td>10/05/98</td><td>3820</td><td>27.6</td><td>5.4</td><td>12/05/98</td><td>5060</td><td>60.6</td><td>8.1</td><td>02/05/99</td><td>4350</td><td>59.5</td><td>6.4</td><td>04/05/99</td><td>5410</td><td>103</td><td>8.1</td><td>06/05/99</td><td>4920</td><td>50.3</td><td>8.5</td><td>08/05/99</td><td>4240</td><td>50.0</td><td>7.5</td><td>10/05/99</td><td>4240</td><td>50.0</td><td>7.5</td><td>12/05/99</td><td>4240</td><td>50.0</td><td>7.5</td></tr> <tr><td>10/06/98</td><td>3940</td><td>30.0</td><td>6.0</td><td>12/06/98</td><td>5120</td><td>50.0</td><td>8.2</td><td>02/06/99</td><td>4480</td><td>65.7</td><td>5.9</td><td>04/06/99</td><td>5610</td><td>98.4</td><td>7.8</td><td>06/06/99</td><td>5160</td><td>52.4</td><td>8.8</td><td>08/06/99</td><td>4010</td><td>39.5</td><td>7.4</td><td>10/06/99</td><td>4010</td><td>39.5</td><td>7.4</td><td>12/06/99</td><td>4010</td><td>39.5</td><td>7.4</td></tr> <tr><td>10/07/98</td><td>4180</td><td>36.1</td><td>6.9</td><td>12/07/98</td><td>5040</td><td>55.3</td><td>8.5</td><td>02/07/99</td><td>4610</td><td>68.7</td><td>6.3</td><td>04/07/99</td><td>5620</td><td>NA</td><td>7.7</td><td>06/07/99</td><td>5200</td><td>48.4</td><td>8.9</td><td>08/07/99</td><td>4180</td><td>39.6</td><td>7.8</td><td>10/07/99</td><td>4180</td><td>39.6</td><td>7.8</td><td>12/07/99</td><td>4180</td><td>39.6</td><td>7.8</td></tr> <tr><td>10/08/98</td><td>4190</td><td>41.0</td><td>7.4</td><td>12/08/98</td><td>4980</td><td>57.4</td><td>8.3</td><td>02/08/99</td><td>4370</td><td>62.3</td><td>6.2</td><td>04/08/99</td><td>5510</td><td>101</td><td>7.4</td><td>06/08/99</td><td>5190</td><td>59.5</td><td>8.5</td><td>08/08/99</td><td>4020</td><td>37.4</td><td>7.7</td><td>10/08/99</td><td>4020</td><td>37.4</td><td>7.7</td><td>12/08/99</td><td>4020</td><td>37.4</td><td>7.7</td></tr> <tr><td>10/09/98</td><td>4960</td><td>47.1</td><td>8.0</td><td>12/09/98</td><td>5020</td><td>92.7</td><td>7.8</td><td>02/09/99</td><td>4570</td><td>66.6</td><td>6.3</td><td>04/09/99</td><td>5360</td><td>110</td><td>7.4</td><td>06/09/99</td><td>5080</td><td>58.4</td><td>8.4</td><td>08/09/99</td><td>3960</td><td>40.1</td><td>7.6</td><td>10/09/99</td><td>3960</td><td>40.1</td><td>7.6</td><td>12/09/99</td><td>3960</td><td>40.1</td><td>7.6</td></tr> <tr><td>10/10/98</td><td>5150</td><td>55.2</td><td>8.3</td><td>12/10/98</td><td>4860</td><td>92.8</td><td>7.3</td><td>02/10/99</td><td>4430</td><td>64.6</td><td>6.2</td><td>04/10/99</td><td>5290</td><td>90.4</td><td>6.9</td><td>06/10/99</td><td>5020</td><td>57.9</td><td>7.1</td><td>08/10/99</td><td>3860</td><td>34.4</td><td>7.4</td><td>10/10/99</td><td>3860</td><td>34.4</td><td>7.4</td><td>12/10/99</td><td>3860</td><td>34.4</td><td>7.4</td></tr> <tr><td>10/11/98</td><td>5390</td><td>58.7</td><td>8.7</td><td>12/11/98</td><td>4500</td><td>67.9</td><td>7.0</td><td>02/11/99</td><td>4410</td><td>66.2</td><td>6.1</td><td>04/11/99</td><td>5310</td><td>92.7</td><td>6.4</td><td>06/11/99</td><td>4790</td><td>51.7</td><td>6.8</td><td>08/11/99</td><td>3700</td><td>30.8</td><td>7.6</td><td>10/11/99</td><td>3700</td><td>30.8</td><td>7.6</td><td>12/11/99</td><td>3700</td><td>30.8</td><td>7.6</td></tr> <tr><td>10/12/98</td><td>4910</td><td>49.0</td><td>7.8</td><td>12/12/98</td><td>4170</td><td>38.4</td><td>6.7</td><td>02/12/99</td><td>4220</td><td>66.4</td><td>5.8</td><td>04/12/99</td><td>5230</td><td>90.1</td><td>6.5</td><td>06/12/99</td><td>4740</td><td>53.4</td><td>7.0</td><td>08/12/99</td><td>3850</td><td>32.0</td><td>6.7</td><td>10/12/99</td><td>3850</td><td>32.0</td><td>6.7</td><td>12/12/99</td><td>3850</td><td>32.0</td><td>6.7</td></tr> <tr><td>10/13/98</td><td>4880</td><td>46.2</td><td>7.7</td><td>12/13/98</td><td>4570</td><td>39.1</td><td>7.8</td><td>02/13/99</td><td>4140</td><td>63.4</td><td>5.6</td><td>04/13/99</td><td>5240</td><td>81.8</td><td>6.4</td><td>06/13/99</td><td>4470</td><td>49.4</td><td>6.9</td><td>08/13/99</td><td>4160</td><td>35.2</td><td>7.1</td><td>10/13/99</td><td>4160</td><td>35.2</td><td>7.1</td><td>12/13/99</td><td>4160</td><td>35.2</td><td>7.1</td></tr> <tr><td>10/14/98</td><td>5000</td><td>53.2</td><td>7.8</td><td>12/14/98</td><td>4720</td><td>43.0</td><td>8.2</td><td>02/14/99</td><td>4330</td><td>58.6</td><td>6.2</td><td>04/14/99</td><td>5440</td><td>83.7</td><td>7.1</td><td>06/14/99</td><td>4380</td><td>42.0</td><td>6.9</td><td>08/14/99</td><td>4190</td><td>34.8</td><td>7.0</td><td>10/14/99</td><td>4190</td><td>34.8</td><td>7.0</td><td>12/14/99</td><td>4190</td><td>34.8</td><td>7.0</td></tr> <tr><td>10/15/98</td><td>5250</td><td>52.2</td><td>8.0</td><td>12/15/98</td><td>4700</td><td>42.3</td><td>8.0</td><td>02/15/99</td><td>4350</td><td>67.1</td><td>6.2</td><td>04/15/99</td><td>5570</td><td>92.5</td><td>7.4</td><td>06/15/99</td><td>4780</td><td>56.4</td><td>7.6</td><td>08/15/99</td><td>4000</td><td>29.3</td><td>6.8</td><td>10/15/99</td><td>4000</td><td>29.3</td><td>6.8</td><td>12/15/99</td><td>4000</td><td>29.3</td><td>6.8</td></tr> <tr><td>10/16/98</td><td>5280</td><td>48.5</td><td>8.3</td><td>12/16/98</td><td>4820</td><td>38.8</td><td>8.3</td><td>02/16/99</td><td>4680</td><td>75.3</td><td>6.7</td><td>04/16/99</td><td>5410</td><td>89.4</td><td>7.0</td><td>06/16/99</td><td>4750</td><td>53.4</td><td>7.8</td><td>08/16/99</td><td>3960</td><td>31.7</td><td>6.7</td><td>10/16/99</td><td>3960</td><td>31.7</td><td>6.7</td><td>12/16/99</td><td>3960</td><td>31.7</td><td>6.7</td></tr> 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<tr><td>10/19/98</td><td>5510</td><td>60.3</td><td>8.5</td><td>12/19/98</td><td>5040</td><td>59.5</td><td>7.6</td><td>02/19/99</td><td>4350</td><td>64.2</td><td>6.4</td><td>04/19/99</td><td>5600</td><td>92.5</td><td>7.7</td><td>06/19/99</td><td>5250</td><td>63.8</td><td>8.1</td><td>08/19/99</td><td>3960</td><td>34.6</td><td>6.6</td><td>10/19/99</td><td>3960</td><td>34.6</td><td>6.6</td><td>12/19/99</td><td>3960</td><td>34.6</td><td>6.6</td></tr> <tr><td>10/20/98</td><td>5150</td><td>53.1</td><td>7.7</td><td>12/20/98</td><td>5210</td><td>56.5</td><td>8.1</td><td>02/20/99</td><td>4650</td><td>70.0</td><td>6.8</td><td>04/20/99</td><td>5680</td><td>100</td><td>7.7</td><td>06/20/99</td><td>5220</td><td>61.5</td><td>7.8</td><td>08/20/99</td><td>4130</td><td>42.9</td><td>6.7</td><td>10/20/99</td><td>4130</td><td>42.9</td><td>6.7</td><td>12/20/99</td><td>4130</td><td>42.9</td><td>6.7</td></tr> 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<tr><td>10/29/98</td><td>5190</td><td>61.3</td><td>8.3</td><td>12/29/98</td><td>5300</td><td>61.9</td><td>8.1</td><td>03/01/99</td><td>5050</td><td>81.2</td><td>7.5</td><td>04/29/99</td><td>5940</td><td>94.1</td><td>8.7</td><td>06/29/99</td><td>4820</td><td>48.4</td><td>8.3</td><td>08/29/99</td><td>3580</td><td>42.9</td><td>5.8</td><td>10/29/99</td><td>3580</td><td>42.9</td><td>5.8</td><td>12/29/99</td><td>3580</td><td>42.9</td><td>5.8</td></tr> <tr><td>10/30/98</td><td>4320</td><td>40.8</td><td>7.0</td><td>12/30/98</td><td>5260</td><td>64.8</td><td>8.1</td><td>03/02/99</td><td>5190</td><td>76.7</td><td>7.7</td><td>04/30/99</td><td>5510</td><td>81.7</td><td>8.1</td><td>06/30/99</td><td>4600</td><td>48.2</td><td>8.0</td><td>08/30/99</td><td>3670</td><td>44.9</td><td>6.1</td><td>10/30/99</td><td>3670</td><td>44.9</td><td>6.1</td><td>12/30/99</td><td>3670</td><td>44.9</td><td>6.1</td></tr> <tr><td>10/31/98</td><td>4410</td><td>38.8</td><td>7.0</td><td>12/31/98</td><td>5570</td><td>94.8</td><td>8.4</td><td>03/03/99</td><td>5140</td><td>78.3</td><td>7.3</td><td>05/01/99</td><td>5330</td><td>75.8</td><td>7.7</td><td>07/01/99</td><td>4540</td><td>50.2</td><td>7.7</td><td>08/31/99</td><td>3690</td><td>50.2</td><td>5.7</td><td>10/31/99</td><td>3690</td><td>50.2</td><td>5.7</td><td>12/31/99</td><td>3690</td><td>50.2</td><td>5.7</td></tr> <tr><td>11/01/98</td><td>4480</td><td>41.9</td><td>6.8</td><td>01/01/99</td><td>5220</td><td>77.5</td><td>7.8</td><td>03/04/99</td><td>5260</td><td>75.7</td><td>7.5</td><td>05/02/99</td><td>5330</td><td>73.0</td><td>7.7</td><td>07/02/99</td><td>4830</td><td>50.5</td><td>7.7</td><td>09/01/99</td><td>3680</td><td>45.4</td><td>6.0</td><td>10/01/99</td><td>3680</td></tr>	10/02/98	3430	21.4	5.2	12/02/98	5230	47.3	8.1	02/02/99	4620	62.7	6.3	04/02/99	5060	90.2	7.3	06/02/99	4920	60.2	7.2	08/02/99	4720	47.4	8.2	10/02/99	4500	45.0	7.5	12/02/99	4600	46.0	7.5	10/03/98	3470	30.8	5.7	12/03/98	5240	49.6	7.9	02/03/99	4160	46.7	5.9	04/03/99	5310	97.6	7.6	06/03/99	4480	52.3	6.9	08/03/99	4850	51.4	8.5	10/03/99	4850	51.4	8.5	12/03/99	4850	51.4	8.5	10/04/98	3850	35.4	5.8	12/04/98	5300	64.8	8.3	02/04/99	4170	52.3	5.9	04/04/99	5330	94.6	7.8	06/04/99	4780	54.9	7.8	08/04/99	4550	51.3	8.2	10/04/99	4550	51.3	8.2	12/04/99	4550	51.3	8.2	10/05/98	3820	27.6	5.4	12/05/98	5060	60.6	8.1	02/05/99	4350	59.5	6.4	04/05/99	5410	103	8.1	06/05/99	4920	50.3	8.5	08/05/99	4240	50.0	7.5	10/05/99	4240	50.0	7.5	12/05/99	4240	50.0	7.5	10/06/98	3940	30.0	6.0	12/06/98	5120	50.0	8.2	02/06/99	4480	65.7	5.9	04/06/99	5610	98.4	7.8	06/06/99	5160	52.4	8.8	08/06/99	4010	39.5	7.4	10/06/99	4010	39.5	7.4	12/06/99	4010	39.5	7.4	10/07/98	4180	36.1	6.9	12/07/98	5040	55.3	8.5	02/07/99	4610	68.7	6.3	04/07/99	5620	NA	7.7	06/07/99	5200	48.4	8.9	08/07/99	4180	39.6	7.8	10/07/99	4180	39.6	7.8	12/07/99	4180	39.6	7.8	10/08/98	4190	41.0	7.4	12/08/98	4980	57.4	8.3	02/08/99	4370	62.3	6.2	04/08/99	5510	101	7.4	06/08/99	5190	59.5	8.5	08/08/99	4020	37.4	7.7	10/08/99	4020	37.4	7.7	12/08/99	4020	37.4	7.7	10/09/98	4960	47.1	8.0	12/09/98	5020	92.7	7.8	02/09/99	4570	66.6	6.3	04/09/99	5360	110	7.4	06/09/99	5080	58.4	8.4	08/09/99	3960	40.1	7.6	10/09/99	3960	40.1	7.6	12/09/99	3960	40.1	7.6	10/10/98	5150	55.2	8.3	12/10/98	4860	92.8	7.3	02/10/99	4430	64.6	6.2	04/10/99	5290	90.4	6.9	06/10/99	5020	57.9	7.1	08/10/99	3860	34.4	7.4	10/10/99	3860	34.4	7.4	12/10/99	3860	34.4	7.4	10/11/98	5390	58.7	8.7	12/11/98	4500	67.9	7.0	02/11/99	4410	66.2	6.1	04/11/99	5310	92.7	6.4	06/11/99	4790	51.7	6.8	08/11/99	3700	30.8	7.6	10/11/99	3700	30.8	7.6	12/11/99	3700	30.8	7.6	10/12/98	4910	49.0	7.8	12/12/98	4170	38.4	6.7	02/12/99	4220	66.4	5.8	04/12/99	5230	90.1	6.5	06/12/99	4740	53.4	7.0	08/12/99	3850	32.0	6.7	10/12/99	3850	32.0	6.7	12/12/99	3850	32.0	6.7	10/13/98	4880	46.2	7.7	12/13/98	4570	39.1	7.8	02/13/99	4140	63.4	5.6	04/13/99	5240	81.8	6.4	06/13/99	4470	49.4	6.9	08/13/99	4160	35.2	7.1	10/13/99	4160	35.2	7.1	12/13/99	4160	35.2	7.1	10/14/98	5000	53.2	7.8	12/14/98	4720	43.0	8.2	02/14/99	4330	58.6	6.2	04/14/99	5440	83.7	7.1	06/14/99	4380	42.0	6.9	08/14/99	4190	34.8	7.0	10/14/99	4190	34.8	7.0	12/14/99	4190	34.8	7.0	10/15/98	5250	52.2	8.0	12/15/98	4700	42.3	8.0	02/15/99	4350	67.1	6.2	04/15/99	5570	92.5	7.4	06/15/99	4780	56.4	7.6	08/15/99	4000	29.3	6.8	10/15/99	4000	29.3	6.8	12/15/99	4000	29.3	6.8	10/16/98	5280	48.5	8.3	12/16/98	4820	38.8	8.3	02/16/99	4680	75.3	6.7	04/16/99	5410	89.4	7.0	06/16/99	4750	53.4	7.8	08/16/99	3960	31.7	6.7	10/16/99	3960	31.7	6.7	12/16/99	3960	31.7	6.7	10/17/98	5670	51.8	8.8	12/17/98	5320	57.4	8.6	02/17/99	4740	72.9	6.9	04/17/99	5320	87.3	6.7	06/17/99	5040	53.0	8.0	08/17/99	4250	43.2	6.9	10/17/99	4250	43.2	6.9	12/17/99	4250	43.2	6.9	10/18/98	5760	57.8	8.8	12/18/98	5200	79.3	7.5	02/18/99	4690	69.1	6.6	04/18/99	5590	98.6	7.5	06/18/99	5030	53.0	8.0	08/18/99	4100	39.1	6.9	10/18/99	4100	39.1	6.9	12/18/99	4100	39.1	6.9	10/19/98	5510	60.3	8.5	12/19/98	5040	59.5	7.6	02/19/99	4350	64.2	6.4	04/19/99	5600	92.5	7.7	06/19/99	5250	63.8	8.1	08/19/99	3960	34.6	6.6	10/19/99	3960	34.6	6.6	12/19/99	3960	34.6	6.6	10/20/98	5150	53.1	7.7	12/20/98	5210	56.5	8.1	02/20/99	4650	70.0	6.8	04/20/99	5680	100	7.7	06/20/99	5220	61.5	7.8	08/20/99	4130	42.9	6.7	10/20/99	4130	42.9	6.7	12/20/99	4130	42.9	6.7	10/21/98	5270	49.0	8.1	12/21/98	5220	54.6	8.3	02/21/99	4640	75.3	6.7	04/21/99	5690	103	7.7	06/21/99	5220	64.4	8.0	08/21/99	4120	42.3	6.7	10/21/99	4120	42.3	6.7	12/21/99	4120	42.3	6.7	10/22/98	5200	50.0	8.0	12/22/98	5300	58.5	8.4	02/22/99	4910	75.8	7.0	04/22/99	5620	97.8	7.2	06/22/99	4920	53.2	7.6	08/22/99	4010	38.9	6.5	10/22/99	4010	38.9	6.5	12/22/99	4010	38.9	6.5	10/23/98	5340	62.3	8.5	12/23/98	5150	51.3	8.1	02/23/99	5020	78.3	7.2	04/23/99	5860	97.6	8.1	06/23/99	4850	54.3	7.7	08/23/99	3640	32.3	5.6	10/23/99	3640	32.3	5.6	12/23/99	3640	32.3	5.6	10/24/98	5330	61.2	8.5	12/24/98	5260	62.8	8.4	02/24/99	4910	76.5	6.8	04/24/99	5710	95.0	7.8	06/24/99	4950	55.5	8.0	08/24/99	3540	25.9	5.7	10/24/99	3540	25.9	5.7	12/24/99	3540	25.9	5.7	10/25/98	5360	65.3	8.4	12/25/98	5400	95.0	7.9	02/25/99	4710	69.1	7.1	04/25/99	5320	81.8	7.7	06/25/99	4840	49.9	7.8	08/25/99	3380	24.8	5.4	10/25/99	3380	24.8	5.4	12/25/99	3380	24.8	5.4	10/26/98	5620	88.4	8.5	12/26/98	5340	74.1	7.9	02/26/99	4800	66.4	7.4	04/26/99	5460	87.1	7.7	06/26/99	4930	49.1	7.9	08/26/99	3780	38.6	5.6	10/26/99	3780	38.6	5.6	12/26/99	3780	38.6	5.6	10/27/98	5580	76.4	9.0	12/27/98	5350	76.1	8.0	02/27/99	4990	75.4	7.3	04/27/99	5800	86.9	8.5	06/27/99	4870	46.3	8.1	08/27/99	3800	40.3	6.3	10/27/99	3800	40.3	6.3	12/27/99	3800	40.3	6.3	10/28/98	5400	64.3	8.8	12/28/98	5300	69.5	8.1	02/28/99	4760	72.0	7.1	04/28/99	5850	90.8	8.6	06/28/99	4860	45.4	8.4	08/28/99	3480	38.8	5.8	10/28/99	3480	38.8	5.8	12/28/99	3480	38.8	5.8	10/29/98	5190	61.3	8.3	12/29/98	5300	61.9	8.1	03/01/99	5050	81.2	7.5	04/29/99	5940	94.1	8.7	06/29/99	4820	48.4	8.3	08/29/99	3580	42.9	5.8	10/29/99	3580	42.9	5.8	12/29/99	3580	42.9	5.8	10/30/98	4320	40.8	7.0	12/30/98	5260	64.8	8.1	03/02/99	5190	76.7	7.7	04/30/99	5510	81.7	8.1	06/30/99	4600	48.2	8.0	08/30/99	3670	44.9	6.1	10/30/99	3670	44.9	6.1	12/30/99	3670	44.9	6.1	10/31/98	4410	38.8	7.0	12/31/98	5570	94.8	8.4	03/03/99	5140	78.3	7.3	05/01/99	5330	75.8	7.7	07/01/99	4540	50.2	7.7	08/31/99	3690	50.2	5.7	10/31/99	3690	50.2	5.7	12/31/99	3690	50.2	5.7	11/01/98	4480	41.9	6.8	01/01/99	5220	77.5	7.8	03/04/99	5260	75.7	7.5	05/02/99	5330	73.0	7.7	07/02/99	4830	50.5	7.7	09/01/99	3680	45.4	6.0	10/01/99	3680
10/02/98	3430	21.4	5.2	12/02/98	5230	47.3	8.1	02/02/99	4620	62.7	6.3	04/02/99	5060	90.2	7.3	06/02/99	4920	60.2	7.2	08/02/99	4720	47.4	8.2		10/02/99	4500	45.0	7.5	12/02/99	4600	46.0	7.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
10/03/98	3470	30.8	5.7	12/03/98	5240	49.6	7.9	02/03/99	4160	46.7	5.9	04/03/99	5310	97.6	7.6	06/03/99	4480	52.3	6.9	08/03/99	4850	51.4	8.5		10/03/99	4850	51.4	8.5	12/03/99	4850	51.4	8.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
10/04/98	3850	35.4	5.8	12/04/98	5300	64.8	8.3	02/04/99	4170	52.3	5.9	04/04/99	5330	94.6	7.8	06/04/99	4780	54.9	7.8	08/04/99	4550	51.3	8.2		10/04/99	4550	51.3	8.2	12/04/99	4550	51.3	8.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
10/05/98	3820	27.6	5.4	12/05/98	5060	60.6	8.1	02/05/99	4350	59.5	6.4	04/05/99	5410	103	8.1	06/05/99	4920	50.3	8.5	08/05/99	4240	50.0	7.5		10/05/99	4240	50.0	7.5	12/05/99	4240	50.0	7.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
10/06/98	3940	30.0	6.0	12/06/98	5120	50.0	8.2	02/06/99	4480	65.7	5.9	04/06/99	5610	98.4	7.8	06/06/99	5160	52.4	8.8	08/06/99	4010	39.5	7.4	10/06/99	4010	39.5	7.4	12/06/99	4010	39.5	7.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/07/98	4180	36.1	6.9	12/07/98	5040	55.3	8.5	02/07/99	4610	68.7	6.3	04/07/99	5620	NA	7.7	06/07/99	5200	48.4	8.9	08/07/99	4180	39.6	7.8	10/07/99	4180	39.6	7.8	12/07/99	4180	39.6	7.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/08/98	4190	41.0	7.4	12/08/98	4980	57.4	8.3	02/08/99	4370	62.3	6.2	04/08/99	5510	101	7.4	06/08/99	5190	59.5	8.5	08/08/99	4020	37.4	7.7	10/08/99	4020	37.4	7.7	12/08/99	4020	37.4	7.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/09/98	4960	47.1	8.0	12/09/98	5020	92.7	7.8	02/09/99	4570	66.6	6.3	04/09/99	5360	110	7.4	06/09/99	5080	58.4	8.4	08/09/99	3960	40.1	7.6	10/09/99	3960	40.1	7.6	12/09/99	3960	40.1	7.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/10/98	5150	55.2	8.3	12/10/98	4860	92.8	7.3	02/10/99	4430	64.6	6.2	04/10/99	5290	90.4	6.9	06/10/99	5020	57.9	7.1	08/10/99	3860	34.4	7.4	10/10/99	3860	34.4	7.4	12/10/99	3860	34.4	7.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/11/98	5390	58.7	8.7	12/11/98	4500	67.9	7.0	02/11/99	4410	66.2	6.1	04/11/99	5310	92.7	6.4	06/11/99	4790	51.7	6.8	08/11/99	3700	30.8	7.6	10/11/99	3700	30.8	7.6	12/11/99	3700	30.8	7.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/12/98	4910	49.0	7.8	12/12/98	4170	38.4	6.7	02/12/99	4220	66.4	5.8	04/12/99	5230	90.1	6.5	06/12/99	4740	53.4	7.0	08/12/99	3850	32.0	6.7	10/12/99	3850	32.0	6.7	12/12/99	3850	32.0	6.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/13/98	4880	46.2	7.7	12/13/98	4570	39.1	7.8	02/13/99	4140	63.4	5.6	04/13/99	5240	81.8	6.4	06/13/99	4470	49.4	6.9	08/13/99	4160	35.2	7.1	10/13/99	4160	35.2	7.1	12/13/99	4160	35.2	7.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/14/98	5000	53.2	7.8	12/14/98	4720	43.0	8.2	02/14/99	4330	58.6	6.2	04/14/99	5440	83.7	7.1	06/14/99	4380	42.0	6.9	08/14/99	4190	34.8	7.0	10/14/99	4190	34.8	7.0	12/14/99	4190	34.8	7.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/15/98	5250	52.2	8.0	12/15/98	4700	42.3	8.0	02/15/99	4350	67.1	6.2	04/15/99	5570	92.5	7.4	06/15/99	4780	56.4	7.6	08/15/99	4000	29.3	6.8	10/15/99	4000	29.3	6.8	12/15/99	4000	29.3	6.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/16/98	5280	48.5	8.3	12/16/98	4820	38.8	8.3	02/16/99	4680	75.3	6.7	04/16/99	5410	89.4	7.0	06/16/99	4750	53.4	7.8	08/16/99	3960	31.7	6.7	10/16/99	3960	31.7	6.7	12/16/99	3960	31.7	6.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/17/98	5670	51.8	8.8	12/17/98	5320	57.4	8.6	02/17/99	4740	72.9	6.9	04/17/99	5320	87.3	6.7	06/17/99	5040	53.0	8.0	08/17/99	4250	43.2	6.9	10/17/99	4250	43.2	6.9	12/17/99	4250	43.2	6.9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/18/98	5760	57.8	8.8	12/18/98	5200	79.3	7.5	02/18/99	4690	69.1	6.6	04/18/99	5590	98.6	7.5	06/18/99	5030	53.0	8.0	08/18/99	4100	39.1	6.9	10/18/99	4100	39.1	6.9	12/18/99	4100	39.1	6.9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/19/98	5510	60.3	8.5	12/19/98	5040	59.5	7.6	02/19/99	4350	64.2	6.4	04/19/99	5600	92.5	7.7	06/19/99	5250	63.8	8.1	08/19/99	3960	34.6	6.6	10/19/99	3960	34.6	6.6	12/19/99	3960	34.6	6.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/20/98	5150	53.1	7.7	12/20/98	5210	56.5	8.1	02/20/99	4650	70.0	6.8	04/20/99	5680	100	7.7	06/20/99	5220	61.5	7.8	08/20/99	4130	42.9	6.7	10/20/99	4130	42.9	6.7	12/20/99	4130	42.9	6.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/21/98	5270	49.0	8.1	12/21/98	5220	54.6	8.3	02/21/99	4640	75.3	6.7	04/21/99	5690	103	7.7	06/21/99	5220	64.4	8.0	08/21/99	4120	42.3	6.7	10/21/99	4120	42.3	6.7	12/21/99	4120	42.3	6.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/22/98	5200	50.0	8.0	12/22/98	5300	58.5	8.4	02/22/99	4910	75.8	7.0	04/22/99	5620	97.8	7.2	06/22/99	4920	53.2	7.6	08/22/99	4010	38.9	6.5	10/22/99	4010	38.9	6.5	12/22/99	4010	38.9	6.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/23/98	5340	62.3	8.5	12/23/98	5150	51.3	8.1	02/23/99	5020	78.3	7.2	04/23/99	5860	97.6	8.1	06/23/99	4850	54.3	7.7	08/23/99	3640	32.3	5.6	10/23/99	3640	32.3	5.6	12/23/99	3640	32.3	5.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/24/98	5330	61.2	8.5	12/24/98	5260	62.8	8.4	02/24/99	4910	76.5	6.8	04/24/99	5710	95.0	7.8	06/24/99	4950	55.5	8.0	08/24/99	3540	25.9	5.7	10/24/99	3540	25.9	5.7	12/24/99	3540	25.9	5.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/25/98	5360	65.3	8.4	12/25/98	5400	95.0	7.9	02/25/99	4710	69.1	7.1	04/25/99	5320	81.8	7.7	06/25/99	4840	49.9	7.8	08/25/99	3380	24.8	5.4	10/25/99	3380	24.8	5.4	12/25/99	3380	24.8	5.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/26/98	5620	88.4	8.5	12/26/98	5340	74.1	7.9	02/26/99	4800	66.4	7.4	04/26/99	5460	87.1	7.7	06/26/99	4930	49.1	7.9	08/26/99	3780	38.6	5.6	10/26/99	3780	38.6	5.6	12/26/99	3780	38.6	5.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/27/98	5580	76.4	9.0	12/27/98	5350	76.1	8.0	02/27/99	4990	75.4	7.3	04/27/99	5800	86.9	8.5	06/27/99	4870	46.3	8.1	08/27/99	3800	40.3	6.3	10/27/99	3800	40.3	6.3	12/27/99	3800	40.3	6.3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/28/98	5400	64.3	8.8	12/28/98	5300	69.5	8.1	02/28/99	4760	72.0	7.1	04/28/99	5850	90.8	8.6	06/28/99	4860	45.4	8.4	08/28/99	3480	38.8	5.8	10/28/99	3480	38.8	5.8	12/28/99	3480	38.8	5.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/29/98	5190	61.3	8.3	12/29/98	5300	61.9	8.1	03/01/99	5050	81.2	7.5	04/29/99	5940	94.1	8.7	06/29/99	4820	48.4	8.3	08/29/99	3580	42.9	5.8	10/29/99	3580	42.9	5.8	12/29/99	3580	42.9	5.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/30/98	4320	40.8	7.0	12/30/98	5260	64.8	8.1	03/02/99	5190	76.7	7.7	04/30/99	5510	81.7	8.1	06/30/99	4600	48.2	8.0	08/30/99	3670	44.9	6.1	10/30/99	3670	44.9	6.1	12/30/99	3670	44.9	6.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
10/31/98	4410	38.8	7.0	12/31/98	5570	94.8	8.4	03/03/99	5140	78.3	7.3	05/01/99	5330	75.8	7.7	07/01/99	4540	50.2	7.7	08/31/99	3690	50.2	5.7	10/31/99	3690	50.2	5.7	12/31/99	3690	50.2	5.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
11/01/98	4480	41.9	6.8	01/01/99	5220	77.5	7.8	03/04/99	5260	75.7	7.5	05/02/99	5330	73.0	7.7	07/02/99	4830	50.5	7.7	09/01/99	3680	45.4	6.0	10/01/99	3680																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

San Luis Drain @ Terminus (MER535S)

Location: Latitude 37.241, Longitude 120.882. In NW 1/4, NE 1/4, NW 1/4, Sec.14, T.7S, R.9E. 5 miles east of Gustine, 3.5 miles southeast of Highway 140, located within Kesterson N.W.R.

AUTOSAMPLER DATA: 24 hour composite samples

WY 2000

DATA SUMMARY

EC				EC				EC				EC				EC				EC				EC				
Se				Se				Se				Se				Se				Se				Se				
B				B				B				B				B				B				B				
Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	Date	umhos/cm	ug/L	mg/L	
10/01/99	4500	41.1	6.9	12/01/99	4320	38.2	7.3	02/01/00	4660	51.4	7.2	04/01/00	5290	83.9	8.1	06/01/00	4330	47.3	7.3	08/01/00	3980	37.6	7.2	<div>Count366366364</div> <div>Min316022.74.6</div> <div>Max57501049.1</div> <div>Mean446954.27.1</div> <div>Geo Mean443751.37.1</div> <div>Median442049.87.1</div>				
10/02/99	4490	32.3	7.1	12/02/99	3990	37.4	6.8	02/02/00	4850	60.6	7.6	04/02/00	5240	85.5	7.9	06/02/00	4240	43.0	6.4	08/02/00	3830	37.6	6.9					
10/03/99	4840	34.2	8.0	12/03/99	4160	50.5	6.7	02/03/00	4870	63.6	7.7	04/03/00	5330	84.2	7.8	06/03/00	4390	41.2	7.4	08/03/00	3840	42.6	6.6					
10/04/99	5050	41.1	8.0	12/04/99	4270	54.5	6.9	02/04/00	4880	59.2	7.7	04/04/00	5270	80.0	7.9	06/04/00	4510	44.2	7.4	08/04/00	3770	34.4	6.9					
10/05/99	4880	35.2	8.0	12/05/99	4240	52.5	7.0	02/05/00	4930	59.9	7.7	04/05/00	5080	77.8	7.5	06/05/00	4360	43.6	7.6	08/05/00	3670	33.1	6.7					
10/06/99	4370	34.8	7.3	12/06/99	4070	49.1	6.6	02/06/00	4960	60.3	7.8	04/06/00	5090	81.6	7.3	06/06/00	4390	42.9	7.7	08/06/00	4110	48.0	6.9					
10/07/99	4340	32.8	7.1	12/07/99	4150	49.8	6.7	02/07/00	4950	63.5	7.9	04/07/00	4970	83.5	7.4	06/07/00	4280	44.8	7.8	08/07/00	3700	33.5	6.6					
10/08/99	4170	29.6	6.6	12/08/99	4470	66.9	7.0	02/08/00	5030	66.6	8.0	04/08/00	4880	80.6	7.1	06/08/00	3980	40.2	7.4	08/08/00	3690	31.8	6.7					
10/09/99	4640	28.8	7.7	12/09/99	4540	71.3	7.1	02/09/00	4950	76.9	7.5	04/09/00	4910	83.2	7.2	06/09/00	4290	48.8	7.4	08/09/00	3840	35.8	7.1					
10/10/99	4680	30.7	7.8	12/10/99	4100	54.2	6.5	02/10/00	4700	70.6	6.7	04/10/00	4890	83.1	7.1	06/10/00	4300	47.2	7.4	08/10/00	3710	36.0	6.8					
10/11/99	4940	37.4	8.3	12/11/99	3850	48.3	5.9	02/11/00	4350	54.4	6.8	04/11/00	5070	80.0	8.5	06/11/00	4360	52.8	7.3	08/11/00	3650	36.0	6.7					
10/12/99	4720	36.3	7.7	12/12/99	4150	51.6	6.5	02/12/00	4140	53.2	6.4	04/12/00	4720	62.8	7.4	06/12/00	4350	57.2	7.1	08/12/00	3820	36.4	6.9					
10/13/99	4630	27.2	7.3	12/13/99	4340	59.7	6.9	02/13/00	4410	62.2	6.7	04/13/00	4700	60.6	7.3	06/13/00	4250	51.9	7.1	08/13/00	3650	30.1	6.8					
10/14/99	4700	26.6	7.4	12/14/99	4520	59.9	7.3	02/14/00	4480	59.2	6.9	04/14/00	5410	83.7	8.4	06/14/00	4100	42.2	7.0	08/14/00	3640	28.3	6.7					
10/15/99	4500	22.7	7.1	12/15/99	4320	45.2	7.0	02/15/00	4400	56.9	6.8	04/15/00	5090	70.4	8.0	06/15/00	4120	41.2	7.0	08/15/00	3320	23.3	6.1					
10/16/99	4550	22.7	7.3	12/16/99	4350	54.8	7.0	02/16/00	4430	56.4	6.7	04/16/00	5390	79.9	8.5	06/16/00	4270	47.2	7.2	08/16/00	3420	24.5	6.3					
10/17/99	4630	29.5	7.3	12/17/99	4660	74.3	6.9	02/17/00	4190	50.6	6.0	04/17/00	5490	79.9	8.6	06/17/00	4350	47.5	7.3	08/17/00	3450	24.7	6.3					
10/18/99	4400	30.4	6.6	12/18/99	4620	63.7	6.7	02/18/00	4530	61.2	6.7	04/18/00	5380	80.0	8.5	06/18/00	4220	42.6	7.0	08/18/00	3730	28.4	6.8					
10/19/99	4380	26.3	6.2	12/19/99	4790	69.9	7.1	02/19/00	4340	62.3	6.7	04/19/00	5140	77.0	7.6	06/19/00	4380	45.5	7.4	08/19/00	3870	34.6	6.8					
10/20/99	4430	29.0	6.5	12/20/99	4800	81.5	7.0	02/20/00	4100	52.6	6.4	04/20/00	4750	74.4	7.0	06/20/00	4440	46.5	7.6	08/20/00	3600	30.4	6.2					
10/21/99	4510	30.6	6.5	12/21/99	4490	62.5	6.4	02/21/00	4350	54.4	6.9	04/21/00	3860	57.1	5.5	06/21/00	4540	51.2	7.7	08/21/00	3160	27.7	5.2					
10/22/99	4430	36.5	6.7	12/22/99	4620	63.0	6.8	02/22/00	4610	62.6	7.2	04/22/00	4070	57.0	5.8	06/22/00	4580	49.8	7.8	08/22/00	3340	31.0	5.5					
10/23/99	4390	31.7	6.6	12/23/99	4880	75.9	7.0	02/23/00	4680	73.2	6.9	04/23/00	4460	62.9	6.4	06/23/00	4480	41.5	7.8	08/23/00	3250	29.0	5.5					
10/24/99	4300	29.7	6.5	12/24/99	4990	82.3	7.0	02/24/00	4440	72.5	6.6	04/24/00	4900	68.5	7.1	06/24/00	4230	37.1	7.4	08/24/00	3530	30.9	6.1					
10/25/99	4420	37.3	6.9	12/25/99	4910	74.0	6.8	02/25/00	4770	59.8	7.4	04/25/00	5270	74.3	7.7	06/25/00	4100	34.8	7.4	08/25/00	3540	29.2	6.3					
10/26/99	4820	49.6	7.1	12/26/99	4860	77.8	7.0	02/26/00	4870	68.2	7.2	04/26/00	5390	72.5	8.2	06/26/00	4270	36.1	7.6	08/26/00	3670	40.0	6.2					
10/27/99	4730	39.9	7.1	12/27/99	4990	80.6	7.2	02/27/00	5200	70.8	7.1	04/27/00	5460	77.3	8.4	06/27/00	4280	36.2	7.3	08/27/00	3420	37.6	5.8					
10/28/99	4610	36.3	7.2	12/28/99	4850	76.0	7.2	02/28/00	5070	61.4	7.8	04/28/00	5590	87.9	8.7	06/28/00	4200	34.8	7.4	08/28/00	3440	31.2	5.8					
10/29/99	4730	50.9	7.5	12/29/99	4870	73.1	7.5	02/29/00	5090	76.2	7.9	04/29/00	5540	78.4	8.6	06/29/00	4200	37.8	7.5	08/29/00	3770	36.7	6.4					
10/30/99	4940	69.3	7.8	12/30/99	4890	74.8	7.6	03/01/00	5010	70.1	7.7	04/30/00	5520	77.2	8.4	06/30/00	4480	47.7	7.6	08/30/00	3870	44.7	6.5					
10/31/99	4770	53.9	7.5	12/31/99	4930	73.4	7.4	03/02/00	4990	67.1	7.8	05/01/00	5600	83.3	8.6	07/01/00	4700	52.1	7.8	08/31/00	4000	44.6	6.5					
11/01/99	4750	42.5	7.4	01/01/00	4930	74.1	7.4	03/03/00	4750	66.3	7.3	05/02/00	5540	81.2	8.6	07/02/00	4280	38.5	7.5	09/01/00	3630	42.2	6.0					
11/02/99	4730	41.5	7.5	01/02/00	4770	65.1	7.4	03/04/00	4590	69.4	6.8	05/03/00	5240	77.1	8.4	07/03/00	4480	47.4	7.5	09/02/00	3800	47.3	6.2					
11/03/99	4760	46.7	7.4	01/03/00	4800	68.5	7.4	03/05/00	4580	66.3	6.9	05/04/00	5400	82.2	8.2	07/04/00	4270	41.2	7.4	09/03/00	3970	46.6	6.6					
11/04/99	4680	38.7	7.1	01/04/00	4700	64.9	7.2	03/06/00	4740	69.8	6.9	05/05/00	5450	82.7	8.4	07/05/00	4070	36.4	7.3	09/04/00	4260	62.3	7.0					
11/05/99	4690	35.8	7.3	01/05/00	4490	48.5	6.9	03/07/00	4870	66.6	7.0	05/06/00	5400	79.2	8.5	07/06/00	4080	35.9	7.2	09/05/00	4160	54.0	6.8					
11/06/99	4700	45.4	7.4	01/06/00	4600	58.4	7.0	03/08/00	4980	75.6	7.3	05/07/00	5100	74.2	8.1	07/07/00	4130	40.6	7.3	09/06/00	4020	49.0	6.4					
11/07/99	4710	53.0	7.4	01/07/00	4660	68.1	7.2	03/09/00	4950	76.3	7.2	05																

Inflow to San Luis Drain (MER562S)

WY 1999

Location: Latitude 36.966, Longitude 120.671. In Sec.21, T.11S, R.12E. West of South Dos Palos, downstream of point where the Grasslands Bypass empties into the San Luis Drain.
AUTOSAMPLER DATA: 24 hour composite samples; **bold data** are weekly composite samples

Date	EC	Se	B	Date	EC	Se	B	Date	EC	Se	B	Date	EC	Se	B	Date	EC	Se	B	Date	EC	Se	B
umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L	umhos/cm	ug/L	mg/L
10/01/98	4860			11/24/98	NA			01/18/99	5520			03/13/99	5420			05/06/99	4630			06/29/99	4790	50.8	7.9
10/02/98	4330			11/25/98	NA			01/19/99	5130			03/14/99	5860			05/07/99	4590			06/30/99	4920		
10/03/98	5140			11/26/98	NA			01/19/99	5400	76.4	8.5	03/15/99	5130			05/08/99	4620			07/01/99	4860		
10/04/98	5580			11/27/98	NA			01/20/99	5060			03/16/99	5390			05/09/99	4400			07/02/99	4910		
10/05/98	NA			11/28/98	NA			01/21/99	5350			03/16/99	5570	91.6	7.8	05/10/99	4590			07/03/99	4790		
10/06/98	NA			11/29/98	NA			01/22/99	4850			03/17/99	5670			05/11/99	4840			07/04/99	4720		
10/07/98	NA			11/30/98	NA			01/23/99	4970			03/18/99	5380			05/11/99	4620	63.3	7.3	07/05/99	4450		
10/07/98	4970	57.3	7.8	11/30/98	5810	64.8	9.5	01/24/99	4920			03/19/99	5850			05/12/99	5130			07/06/99	4620		
10/08/98	NA			12/01/98	NA			01/25/99	4620			03/20/99	5610			05/13/99	4740			07/06/99	4730	49.3	7.6
10/09/98	5500			12/02/98	5610			01/26/99	4900			03/21/99	5360			05/14/99	4750			07/07/99	5040		
10/10/98	5610			12/03/98	4650			01/26/99	5060	69.7	8.1	03/22/99	5830			05/15/99	4450			07/08/99	4530		
10/11/98	5720			12/04/98	4600			01/27/99	4700			03/23/99	5730			05/16/99	4470			07/09/99	4730		
10/12/98	5620			12/05/98	5180			01/28/99	4500			03/23/99	5590	94.4	7.2	05/17/99	4520			07/10/99	4270		
10/12/98	5670	57.0	9.3	12/06/98	5420			01/29/99	4120			03/24/99	5650			05/18/99	4460			07/11/99	4370		
10/13/98	NA			12/07/98	5330			01/30/99	3870			03/25/99	5680			05/18/99	4640	59.8	7.4	07/12/99	4390		
10/14/98	NA			12/08/98	5250			01/31/99	4440			03/26/99	5850			05/19/99	4900			07/13/99	4440		
10/15/98	5370			12/08/98	5130	62.1	8.4	02/01/99	4230			03/27/99	5760			05/20/99	4950			07/13/99	NA	43.7	7.4
10/16/98	5470			12/09/98	5290			02/02/99	4650			03/28/99	5830			05/21/99	5010			07/14/99	4620		
10/17/98	5790			12/10/98	5450			02/02/99	4530	66.3	6.9	03/29/99	5760			05/22/99	5050			07/15/99	4430		
10/18/98	6340			12/11/98	5990			02/03/99	4890			03/30/99	6060			05/23/99	4810			07/16/99	4240		
10/19/98	6250			12/12/98	5410			02/04/99	4440			03/30/99	5830	99.2	7.6	05/24/99	4680			07/17/99	4150		
10/20/98	5920			12/13/98	5490			02/05/99	4750			03/31/99	6340			05/25/99	4690			07/18/99	4140		
10/21/98	6220			12/14/98	5480			02/06/99	4840			04/01/99	6470			05/25/99	4870	53.6	7.2	07/19/99	4160		
10/21/98	5940	70.0	9.3	12/15/98	5580			02/07/99	4560			04/02/99	6450			05/26/99	4830			07/20/99	4090		
10/22/98	6310			12/15/98	5550	88.1	8.9	02/08/99	4450			04/03/99	6200			05/27/99	5090			07/20/99	4260	40.1	7.1
10/23/98	5890			12/16/98	5640			02/09/99	4350			04/04/99	5820			05/28/99	5080			07/21/99	4000		
10/24/98	5680			12/17/98	5450			02/09/99	4630	70.4	6.7	04/05/99	6420			05/29/99	5050			07/22/99	4320		
10/25/98	4620			12/18/98	6280			02/10/99	4240			04/06/99	6470			05/30/99	4660			07/23/99	4280		
10/26/98	4720			12/19/98	5820			02/11/99	4500			04/06/99	5930	117	7.8	05/31/99	4620			07/24/99	4330		
10/27/98	4620			12/20/98	5870			02/12/99	4620			04/07/99	4970			06/01/99	4730			07/25/99	4200		
10/27/98	5000	68.4	8.5	12/21/98	5700			02/13/99	4920			04/08/99	5340			06/01/99	4850	55.9	7.3	07/26/99	4290		
10/28/98	5200			12/21/98	5810	97.4	9.1	02/14/99	5040			04/09/99	5260			06/02/99	5060			07/27/99	4040		
10/29/98	4880			12/22/98	5620			02/15/99	4540			04/10/99	5390			06/03/99	5070			07/27/99	4240	38.6	7.4
10/30/98	5050			12/23/98	5660			02/16/99	4470			04/11/99	5400			06/04/99	5130			07/28/99	4430		
10/31/98	5370			12/24/98	6260			02/16/99	4720	72.5	6.5	04/12/99	5440			06/05/99	4990			07/29/99	4720		
11/01/98	5800			12/25/98	5880			02/17/99	4840			04/13/99	5410			06/06/99	4990			07/30/99	4610		
11/02/98	5150			12/26/98	5430			02/18/99	4990			04/13/99	5290	95.1	7.0	06/07/99	4850			07/31/99	4810		
11/03/98	4950			12/27/98	5340			02/19/99	5030			04/14/99	5560			06/08/99	4630			08/01/99	4500		
11/03/98	5230	63.4	7.6	12/28/98	5640			02/20/99	5210			04/15/99	5530			06/08/99	4880	54.7	8.0	08/02/99	4060		
11/04/98	5040			12/28/98	5680	89.7	9.0	02/21/99	5070			04/16/99	5550			06/09/99	4750			08/03/99	3860		
11/05/98	5360			12/29/98	NA			02/22/99	4990			04/17/99	5610			06/10/99	4510			08/03/99	4420	47.2	7.6
11/06/98	5210			12/30/98	5050			02/23/99	4800			04/18/99	5310			06/11/99	4530			08/04/99	4220		
11/07/98	5320			12/31/98	4830			02/23/99	4900	82.6	6.9	04/19/99	5010			06/12/99	4880			08/05/99	4070		
11/08/98	5180			01/01/99	5370			02/24/99	4310			04/20/99	4900			06/13/99	4890			08/06/99	4020		
11/09/98	5080			01/02/99	5270			02/25/99	4820			04/20/99	5370	90.6	7.5	06/14/99	4880			08/07/99	3860		
11/10/98	5230			01/03/99	5110			02/26/99	4280			04/21/99	5570			06/15/99	4660			08/08/99	3680		
11/10/98	5220	62.2	7.9	01/04/99	5040			02/27/99	4440			04/22/99	5840			06/15/99	4810	53.9	7.5	08/09/99	3840		
11/11/98	5280			01/05/99	4860			02/28/99	4340			04/23/99	5960			06/16/99	5260			08/10/99	4100		
11/12/98	5320			01/05/99	5080	68.4	8.4	03/01/99	4370			04/24/99	6040			06/17/99	5180			08/10/99	3930	36.5	6.8
11/13/98	5620			01/06/99	4940			03/02/99	4540			04/25/99	5600			06/18/99	5040			08/11/99	4160		
11/14/98	5100			01/07/99	4940			03/02/99	4260	86.9	7.7	04/26/99	5310			06/19/99	4870			08/12/99	3960		
11/15/98	5450			01/08/99	4940			03/03/99	5460			04/27/99	5440			06/20/99	4810			08/13/99	3990		
11/16/98	5620			01/09/99	5890			03/04/99	5440			04/27/99	5650	93.5	8.1	06/21/99	4780			08/14/99	4250		
11/17/98	5610			01/10/99	5170			03/05/99	5540			04/28/99	5320			06/22/99	4810			08/15/99	4080		
11/17/98	5390	66.6	8.7	01/11/99	5140			03/06/99	5400			04/29/99	4990			06/22/99	4850	55.5	7.5	08/16/99	3960		
11/18/98	6350			01/12/99	5230			03/07/99	5340			04/30/99	5170			06/23/99	5010			08/17/99	3920		
11/19/98	6870			01/12/99	5000	88.2	8.0	03/08/99	5330			05/01/99	4380			06/24/99	4970			08/17/99	4040	37.5	6.9
11/20/98	6140			01/13/99	5180			03/09/99	5360			05/02/99	4630			06/25/99	4960			08/18/99	4430		
11/21/98	5840			01/14/99	5610			03/09/99	5430	96.8	7.8	05/03/99	4480			06/26/99	4850			08/19/99	4200		
11/22/98	5900			01/15/99	5160			03/10/99	5550			05/04/99	4390			06/27/99	4480			08/20/99	3790		
11/23/98	5830			01/16/99	5140			03/11/99	5480			05/04/99	4940	71.8	7.0	06/28/99	4610			08/21/99	3630		

Inflow to San Luis Drain (MER562S)

Location: Latitude 36.966, Longitude 120.671. In Sec.21, T.11S, R.12E. West of South Dos Palos, downstream of point where the Grasslands Bypass empties into the San Luis Drain.

AUTOSAMPLER DATA: 24 hour composite samples; **bold data** are weekly composite samples

WY 2000

Date	EC umhos/cm	Se ug/L	B mg/L	Date	EC umhos/cm	Se ug/L	B mg/L	Date	EC umhos/cm	Se ug/L	B mg/L	Date	EC umhos/cm	Se ug/L	B mg/L	Date	EC umhos/cm	Se ug/L	B mg/L
10/01/99	4800			11/24/99	5040			01/18/00	3640			03/12/00	5640			05/05/00	4270		
10/02/99	4540			11/25/99	4270			01/18/00	5020	92.1	8.1	03/13/00	5570			05/06/00	4220		
10/03/99	4320			11/26/99	4280			01/19/00	4050			03/14/00	5670			05/07/00	4000		
10/04/99	4780			11/27/99	4380			01/20/00	4690			03/14/00	5520	94.9	8.4	05/08/00	3860		
10/05/99	5410			11/28/99	4540			01/21/00	4850			03/15/00	5870			05/09/00	4110		
10/05/99	5060	45.3	8.4	11/28/99	4540	51.2	7.5	01/22/00	5000			03/16/00	5870			05/09/00	4360	52.3	6.8
10/06/99	5250			11/29/99	NA			01/23/00	4580			03/17/00	5750			05/10/00	4300		
10/07/99	5040			11/30/99	NA			01/24/00	4170			03/18/00	5760			05/11/00	4010		
10/08/99	5140			12/01/99	4640			01/25/00	4280			03/19/00	5740			05/12/00	3930		
10/09/99	5180			12/02/99	4860			01/25/00	4520	74.3	6.9	03/20/00	5610			05/13/00	4030		
10/10/99	4900			12/03/99	4060			01/26/00	4710			03/21/00	5610			05/14/00	4270		
10/11/99	5160			12/04/99	4200			01/27/00	5070			03/21/00	5750	99.0	8.5	05/15/00	4340		
10/12/99	4990			12/05/99	4550			01/28/00	5150			03/22/00	5520			05/16/00	4370		
10/12/99	5100	45.6	9.1	12/06/99	4590			01/29/00	5150			03/23/00	5330			05/16/00	4160	46.6	6.9
10/13/99	4880			12/07/99	4610			01/30/00	5140			03/24/00	5550			05/17/00	4490		
10/14/99	5040			12/07/99	4500	65.2	7.2	01/31/00	5140			03/25/00	5620			05/18/00	4180		
10/15/99	5060			12/08/99	4890			02/01/00	5160			03/26/00	5450			05/19/00	4580		
10/16/99	4930			12/09/99	5070			02/01/00	5100	67.7	8.1	03/27/00	5190			05/20/00	4680		
10/17/99	4670			12/10/99	5140			02/02/00	5160			03/28/00	5200			05/21/00	4400		
10/18/99	4630			12/11/99	5040			02/03/00	5190			03/28/00	5410	91.4	8.1	05/22/00	4170		
10/19/99	5240			12/12/99	4750			02/04/00	5260			03/29/00	5400			05/23/00	4230		
10/19/99	4930	52.1	7.9	12/13/99	4950			02/05/00	4970			03/30/00	5490			05/23/00	4400	42.9	7.6
10/20/99	NA			12/14/99	5100			02/06/00	4650			03/31/00	5190			05/24/00	4470		
10/21/99	5580			12/14/99	5010	91.3	7.6	02/07/00	4460			04/01/00	5000			05/25/00	4210		
10/22/99	5360			12/15/99	5340			02/08/00	4250			04/02/00	5140			05/26/00	4280		
10/23/99	5400			12/16/99	5270			02/08/00	4860	74.8	7.7	04/03/00	4950			05/27/00	4550		
10/24/99	NA			12/17/99	5210			02/09/00	4590			04/04/00	4900			05/28/00	4310		
10/25/99	5600			12/18/99	5230			02/10/00	4690			04/04/00	NA	81.2	7.5	05/29/00	4130		
10/26/99	5460			12/19/99	5260			02/11/00	4570			04/05/00	4970			05/30/00	4280		
10/27/99	5350			12/19/99	5320	101	8.0	02/12/00	4520			04/06/00	5110			05/30/00	4310	47.1	7.0
10/27/99	5480	69.1	9.0	12/20/99	NA			02/13/00	4420			04/07/00	4800			05/31/00	4640		
10/28/99	5260			12/21/99	NA			02/14/00	4380			04/08/00	4880			06/01/00	4400		
10/29/99	5380			12/22/99	5470			02/15/00	4810			04/09/00	5410			06/02/00	4470		
10/30/99	5090			12/23/99	5570			02/15/00	4570	66.2	7.0	04/10/00	5060			06/03/00	4200		
10/31/99	5120			12/24/99	5370			02/16/00	4280			04/11/00	5360			06/04/00	4280		
11/01/99	5200			12/25/99	5190			02/17/00	4240			04/11/00	5110	78.8	8.0	06/05/00	4120		
11/02/99	4830			12/26/99	5310			02/18/00	4700			04/12/00	5570			06/06/00	3960		
11/02/99	5220	65.0	7.9	12/26/99	5380	104	8.1	02/19/00	4920			04/13/00	5500			06/06/00	4310	43.0	7.3
11/03/99	4970			12/27/99	NA			02/20/00	4780			04/14/00	5290			06/07/00	4370		
11/04/99	4560			12/28/99	NA			02/21/00	4820			04/15/00	5220			06/08/00	4310		
11/05/99	4320			12/29/99	5070			02/22/00	4790			04/16/00	5130			06/09/00	4250		
11/06/99	4210			12/30/99	5190			02/22/00	NA	71	7.3	04/17/00	4170			06/10/00	4080		
11/07/99	4260			12/31/99	5230			02/23/00	5080			04/18/00	3950			06/11/00	4000		
11/08/99	4270			01/01/00	5060			02/24/00	5290			04/18/00	5040	82.1	7.7	06/12/00	4150		
11/09/99	4430			01/02/00	5100			02/25/00	5240			04/19/00	4430			06/13/00	4230		
11/09/99	4470	58.1	6.9	01/03/00	4920			02/26/00	5100			04/20/00	4980			06/13/00	4190	44.6	7.0
11/10/99	NA			01/04/00	4850			02/27/00	5010			04/21/00	5420			06/14/00	4310		
11/11/99	4370			01/04/00	5023	91.5	8.1	02/28/00	5020			04/22/00	5480			06/15/00	4400		
11/12/99	4610			01/05/00	4960			02/29/00	4850			04/23/00	5530			06/16/00	4500		
11/13/99	4530			01/06/00	4920			02/29/00	5180	73.5	7.8	04/24/00	5530			06/17/00	4530		
11/14/99	4590			01/07/00	5150			03/01/00	4620			04/25/00	5480			06/18/00	4645		
11/15/99	4450			01/08/00	5150			03/02/00	4710			04/25/00	5280	79.2	7.9	06/19/00	4400		
11/16/99	4680			01/09/00	5160			03/03/00	4860			04/26/00	5550			06/20/00	4200		
11/17/99	4550			01/10/00	4790			03/04/00	4990			04/27/00	5530			06/20/00	4440	46.0	7.2
11/17/99	4560	55.2	7.5	01/11/00	5290			03/05/00	5070			04/28/00	5270			06/21/00	4130		
11/18/99	4140			01/11/00	5090	93.3	8.1	03/06/00	5040			04/29/00	5390			08/15/00	3620	26.1	6.6
11/19/99	4690			01/12/00	5180			03/07/00	4940			04/30/00	5370			06/23/00	4320		
11/20/99	4490			01/13/00	5240			03/07/00	4910	79.6	6.9	05/01/00	5410			06/24/00	4130		
11/21/99	4580			01/14/00	5250			03/08/00	5160			05/02/00	5260			06/25/00	4130		
11/22/99	NA			01/15/00	5290			03/09/00	5540			05/02/00	5420	85.2	8.6	06/26/00	4330		
11/23/99	NA			01/16/00	5360			03/10/00	5490			05/03/00	5000			06/27/00	4710		
11/23/99	4490	52.3	7.3	01/17/00	5030			03/11/00	5560			05/04/00	4720			06/27/00	4270	39.1	7.5

DATA SUMMARY

	EC umhos/cm	Se ug/L	B mg/L
Count	324	52	52
Min	3210	26.1	5.9
Max	5870	104	9.1
Mean	4582	62.3	7.5
Geo Mean	4542	58.8	7.4
Median	4550	55.1	7.5

APPENDIX C

Corrected Monthly Salt Loads from Site B (San Luis Drain Discharge) for Water Years 1997, 1998, 1999

Month	Salt Load (tons)		
	WY97	WY98	WY99
Oct	5,071	7,820	9,739
Nov	6,049	6,594	7,543
Dec	8,021	6,221	7,140
Jan	15,434	7,036	7,906
Feb	20,464	23,907	14,878
Mar	22,914	34,245	17,737
Apr	22,550	29,251	11,528
May	20,064	27,037	13,825
Jun	16,154	16,741	16,246
Jul	13,873	18,495	17,062
Aug	11,710	15,562	15,591
Sep	4,934	12,204	9,886
Totals:	167,235	205,112	149,082

Changes from previous estimates are based on revising the
 EC:TDS coefficient from 0.62 to 0.74 for discharge from the SLD at site B
 --data review indicated that an incorrect coefficient, 0.62, was used in the former calculation spreadsheet
 --previous to the GBP, distinct ratios had been used for discharges from each of the individual districts
 --the 0.74 coefficient is based on TDS and EC data collected weekly since January 2000
 and results from a 24-hour survey